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11A

CLAY TOBACCO-PIPES, WITH PARTICULAR REFERENCE TO THE BRISTOL INDUSTRY

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DEPARTMENT OF INDIAN AND NORTHERN AFFAIRS

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ERRATA ET CORRIGENDA

Vol A

p.x line 1: for "1930, 1931)." read "1930, 1931 ed)."
p.xxi line 19: for "1790" read "1789"

Vol B

p.453 line 16: for "Berriman" read "Berryman"
p.479 line 21: for "filed" read "failed"
p.492 line 33: for "44" read "43"
p.507 line 6: for "FIG 143" read "FIG 147"
p.510 line 26: for "1744" read "1774"
p.530 line 24: for "St Mary Redcliff" read "St Mary Redcliffe"
p.554 line 4: for "FIG 146" read "FIG 150"
----- line 6: for "FIG 147" read "FIG 151"
p.557 line 44: for "p.1075" read "p.712"
p.591 line 43: for "Oy" read "by"
p.605 lines 13 and 42: for "FIG 150" read "FIG 154"
p.608 line 1: for "H. Camp:" read "H. Camp 1968:"
p.609 line 47: for "pp894-5" read "p.600"
----- last line: for "p.901" read "p.604"
p.611 line 23: for "Cherriton" read "Cheriton"
p.618 line 7: for "p.518" read "p.520"
p.619 line 27: for "is" read "if"
p.624 line 27: for "FIG 118" read "FIG 121"
----- line 30: for "FIG 119" read "FIG 122"
p.625 lines 1-2 and 11: for "FIG 118" read "FIG 121"
p.626 line 10: for "FIG 154" read "FIG 158"
p.637 line 49: for "S R" read "S·R"
p.638 line 17: at end of line replace full stop with comma and add "fl Bristol 1818."
p.644 line 45: for "1700" read "1770"
p.648 line 40: for "Campion" read "Champion"
p.649 line 14: for "docization" read "dockization"
p.653 line 10: for "Ghanian" read "Ghanaian"
----- line 46: for "palavar" read "palaver"
p.655 line 27: for "p.978" read "p.652"
p.656 line 32: for "FIG 156" read "FIG 160"
p.657 line 12: for "FIG 154" read "FIG 160"
p.659 lines 13-14: for "FIG 157" read "FIG 161"
----- line 19: for "FIG 156" read "FIG 160"
p.661 line 2: for "FIG 158" read "FIG 162"
p.665 line 21: for "FIG 159" read "FIG 163"
p.667 line 47: insert "fl Bristol 1818," after "1784-1812,"
p.668 line 40: for "FIG 160" read "FIG 164"

p.670 line 42: for "FIG 118" read "FIG 121"
p.672 last line: for "FIG 161" read "FIG 165"
p.673 line 2: for "an" read "and"
p.675 line 34: for "1750-56" read "1751-56"
p.676 line 6: for "Gaspereaux" read "Gaspareaux"
p.676 line 7: for "1750-56" read "1751-56"
p.679 line 26: for "FIG 160" read "FIG 166"
p.680 line 43: for "FIG 162" read "FIG 166"
p.681 line 27: for "bowl" read "stem"
p.686 line 5: for "Berriman" read "Berryman"
----- line 31: for "brought" read "bought"
p.687 line 31: for "p.870" read "p.586"
p.690 line 40: for "A.J. Bold" read "A J. Bold"
p.691 line 18: for "FIG 151" read "FIG 163"
p.693 line 33: for "FIG 107" read "FIG 111"
p.697 line 37: for "reat" read "Great"
p.699 line 23: for "FIG 158" read "FIG 169"
----- line 40: for "FIG 165" read "FIG 169"
p.700 line 32: for "FIG 159" read "FIG 170"
p.701 line 20: for "1972" read "1952"
----- line 28: for "FIG 158" read "FIG 169"
p.712 line 30: for "country" read "county"
p.713 line 1: for "FIG 166" read "FIG 176"
p.716 line 23: for "FIG 166" read "FIG 178"
p.726 line 17: for "St Mary Redcliff" read "St Mary Redcliffe"
p.751 line 3: for "aerial" read "aërial"
p.752 line 8: delete "(FIG 163)"
p.754 line 5: for "FIGS 170, 193-4" read "FIGS 182, 205-6"
p.755 line 34: insert comma between "Peter Addie" and "Council House"
p.787 line 5: for "Liége" read "Liège"
p.816 line 14: insert closing bracket after "paragraph"
p.824 line 46: for "FIG 167" read "FIG 169"
----- last line: for "FIGS 176, 78" read "FIGS 176, 178"

Vol C
p.1418 line 5: for "Vol I pp1012-14" read "p.674"
p.1424 line 2: for "this bowl" read "fig a"
p.1438 line 4: for "vol I pp908-9" read "pp608-9"

Vol D
p.1572 line 15: for "FIG 154" read "FIG 158"
p.1602 line 6: for "Stopper" read "stopper"
p.1682 FIG 122 caption: references in the caption to FIG 122 should read FIG 121
p.1686 FIGS 125-127 caption: references in the caption to FIGS 126, 127, and 128 should read respectively FIGS 125, 126, and 127
p.1688 line 4: for "FIG 126" read "FIG 125"
p.1794 FIG 186 caption: for "FIG 186 and 192" read "FIG 185 and 191"

Pipes are occasionally of extraordinary interest - nothing has more individuality save, perhaps, watches and bootlaces.

Sherlock Holmes

"The Yellow Face", February 1893 (The Memoirs of Sherlock Holmes)

Hot Snacks

Clay Tobacco-Pipes, with Particular
Reference to the Bristol Industry
by Iain C. Walker

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Chapter 3 - History of the Clay Pipe Industry
Chapter 4 - Pipemaking in Various Centres
Chapter 5 - Production Costs and Wages

Volume B. Chapter 6 - Bristol
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Abstract

This study considers clay tobacco-pipe manufacture with specific reference to the industry in Bristol. As a background, the basic archaeological usefulness of clay pipes as a means to date sites is outlined, the introduction of tobacco to Europeans considered, and the various methods of tobacco-taking over the centuries examined. An extensive examination of clay-pipe manufacturing processes in France, The Netherlands, Belgium, Germany, Denmark, Sweden, Great Britain, and the United States of America is made of what is known about the history of the pipe industry in most of these countries is outlined. The pipemaking industries in five centres - Liverpool, Chester, Glasgow, Montreal, and East London - are considered in some detail as a means of noting aspects or features which might be encountered again and thus relate to the detailed study of the Bristol industry. A section is devoted to the scattered evidence from the C16 to C20 on production costs for clay pipes and wages earned by pipemakers.

The origins, rise, decline, re-emergence, and final demise of the Bristol clay-pipe industry is examined in detail in the light of documentary and archaeological evidence. Trends are noted from the apprenticeship rolls, burgess books, poll-books, and trade directories, and the interrelationships of the evidence are evaluated. Contemporary evidence in the form of C19 newspaper articles and an autobiography of a Bristol pipemaker of the later C18 are related to economic and social history evidence at a local and to some degree national level. The distribution of Bristol-made pipes at home and abroad is examined and mapped in detail. In the case of the former its relationship to the Broseley and Herefordshire industries to the north is considered; in the case of the latter, the manner in which it fitted the overall patterns of Bristol trade. Finally, the historical and socio-economic background of the C19 pipemakers' ghetto of St Jude's is discussed in some detail.

Submitted for publication 1977
by Iain C. Walker,
National Historic Parks and Sites Branch,
Ottawa

Abrégé

Cette étude traite de l'industrie de la fabrication des pipes en terre, par rapport à celle de Bristol en particulier. En guise de cadre, on explique l'utilité des pipes en terre au point de vue archéologique pour la datation des sites, on parle de l'introduction du tabac en Europe et l'on examine les diverses méthodes de consommation du tabac au cours des siècles. On étudie à fond les procédés de fabrication des pipes en terre en France, en Hollande, en Belgique, en Allemagne, au Danemark, en Suède, en Angleterre et aux Etats-Unis et l'on expose les faits connus de l'histoire de l'industrie de la fabrication des pipes dans la plupart de ces pays. On étudie d'assez près l'industrie de la fabrication des pipes dans cinq centres de fabrication: Liverpool, Chester, Glasgow, Montréal et Londres-Est, en vue de consigner certains aspects ou éléments qui pourraient se présenter à nouveau et se rattacher, par conséquent, à l'étude détaillée de l'industrie de Bristol. Une section est consacrée à des indications sur les coûts de production des pipes en terre et les revenus des fabricants de pipes, du XVI^{e} au XX^{e} siècle.

Les débuts, la montée, le déclin, la renaissance et enfin la ruine de l'industrie de la fabrication des pipes en terre de Bristol font l'objet d'une étude détaillée à la lumière de preuves documentaires et archéologiques. On relève les tendances indiquées par les registres des apprentis, les registres des bourgeois, les registres de scrutin et les annuaires commerciaux, et on évalue les rapports entre ces preuves. Des documents contemporains sous forme d'articles de journaux du XIX^{e} siècle ainsi qu'une autobiographie d'un fabricant de pipes de Bristol de la fin du XVIII^{e} siècle sont reliés à des faits de l'histoire socio-économique au niveau local et jusqu'à un certain point, national. L'écoulement, dans le pays et à l'extérieur, des pipes fabriquées à Bristol, est étudié et signalé en détail sur des cartes géographiques. Dans le cas de l'écoulement intérieur, on examine les rapports avec les industries de Broseley et du Herefordshire dans le Nord; pour ce qui est de l'écoulement extérieur, on étudie comment il s'insère dans les structures générales du commerce de Bristol. Enfin, on expose en détail les antécédents socio-économiques des fabricants de pipes du ghetto de Saint-Jude au XIX^{e} siècle.

Comme mentionné au chapitre 1, section III, une étude analytique des nombreux documents relatifs à l'usage du tabac en Angleterre et ailleurs s'impose. Le livre de Dickson Panacea or Precious Bane: Tobacco in Sixteenth Century Literature (1954) est un ouvrage savant mais porte presque exclusivement sur le XVI^{e} siècle; un prolongement dans le même sens, englobant le XVII^{e} siècle pour l'Angleterre et l'Europe serait une mise à jour utile des ouvrages de Fairholt Tobacco: Its History and Associations (1859), Apperson The Social History of Smoking (1914) et Corti A History of

Smoking (1930, 1931). Ces trois derniers ouvrages, celui de Fairholt et surtout celui d'Apperson pour l'Angleterre, et celui de Corti pour l'Europe, cernent bien l'histoire sociale de l'usage du tabac, mais ce domaine particulier gagnerait probablement à être examiné à nouveau. Les diverses sous-sections de la section VII du chapitre 1 (méthodes de consommation du tabac) indiquent que la majorité de ces thèmes mériteraient une étude détaillée. En particulier, les faits entourant l'introduction de la cigarette et de la pipe de bruyère, qui ne remonte pourtant qu'aux années 1850, sont obscurs et appartiennent déjà à la légende. L'histoire de la pipe en écume de mer et de la pipe en porcelaine n'a pas été touchée.

Le chapitre 2 est l'une des parties les plus importantes de cette étude. Pour la première fois, on s'est livré à une étude approfondie sur la fabrication des pipes en terre en Europe occidentale et son expansion de l'Angleterre à la Hollande, puis à l'Allemagne, à la Belgique, à la France et aux pays scandinaves. Cela a abouti non seulement à des exposés détaillés sur les méthodes de fabrication utilisées par deux fabriques anglaises, deux fabriques allemandes, une fabrique hollandaise et une belge, mais une analyse de documents et de pièces de musée a révélé un grand nombre de faits jusqu'ici inconnus sur les techniques et les outils de fabrication. On n'a pu consulter quelques encyclopédies anglaises obscures, par manque de temps et à cause de difficultés d'accès; cela s'applique également au matériel similaire en langue française et l'on peut présumer de l'existence de sources hollandaises, allemandes et scandinaves qu'on n'a pu retracer. Cependant, on estime que cette étude sur les méthodes de fabrication et leur histoire est définitive. Il reste toutefois à entreprendre une étude poussée sur les argiles utilisées en Europe occidentale pour la fabrication des pipes (voir chapitre 2, section IX). Les pipes en terre à tuyau court d'Amérique du Nord (voir chapitre 2, section VIII) constituent à elles seules une industrie particulière qui n'a pas encore été étudiée à fond.

A l'origine, le chapitre 3 ne devait renfermer qu'un brève étude de base des industries de fabrication des pipes dans divers pays de l'Europe occidentale pour compléter les exposés sur les techniques de fabrication dans ces pays (chapitre 2) et pour fournir au lecteur une orientation générale. On l'a augmenté pour la principale raison qu'on s'est rendu compte que l'information provenait souvent de documents obscurs ou même inédits, et parce qu'on a estimé que cette section pourrait constituer un répertoire utile des données recueillies pouvant fournir un point de départ aux futurs chercheurs. Dans le cas de l'Angleterre, l'évolution rapide et constante des recherches dans le domaine des pipes devrait permettre d'arriver à une synthèse dans un avenir prochain, et effectivement, Oswald croit être en mesure de réaliser une telle mission avec l'aide d'un certain nombre de chercheurs engagés dans des études régionales (cela s'est récemment concrétisé - voir "preface"). La section I du chapitre 3 n'est donc qu'on bref compte rendu de quelques-unes des plus récentes conclusions des études auxquelles s'ajoutent des preuves non consignées jusqu'ici, rassemblées au cours des principaux travaux de recherche de cette étude, par exemple, ceux qui portent sur le matériel relié aux débuts de l'histoire de la corporation des fabricants de pipes de Westminster-Londres.

En ce qui a trait à l'industrie hollandaise (chapitre 3, section II), l'ouvrage d'importance est toujours celui de Helbers et Goedewaagen

Goudsche pijpen (1942), bien qu'il soit épuisé et devenu très rare, et qu'il ne traite que du centre de fabrication principal, c'est-à-dire Gouda. On n'y trouve non plus aucune illustration de fourneau et les divers articles de Friederich (1964a-d; 1970) ne forment pas une base satisfaisante pour tenter une typologie. Nous n'avons entendu parler d'aucun travail sur les pipes effectué par les archéologues hollandais bien que les pipes doivent abonder dans les sites et les épaves de l'époque postmédiévale en Hollande. Etant donné la présence fréquente de pipes hollandaises dans les sites historiques d'Amérique du Nord, une étude approfondie des documents se rapportant aux pipes hollandaises serait extrêmement utile.

A notre connaissance, rien n'a été fait en Allemagne (voir chapitre 3, section IV) au niveau de l'étude de la fabrication des pipes dans ce pays. L'industrie de Westerwald, qui semble avoir été la plus importante, n'a absolument pas été étudiée et l'on ne sait rien de ses origines à l'exception des déductions établies dans cette étude à partir de faits linguistiques et technologiques. Comme c'est le cas pour la fabrication des pipes ailleurs en Allemagne, les faits actuellement connus proviennent de références occasionnelles, en général de sources hollandaises. L'origine des pipes en terre Gottfried Aust à tuyau court, qui ont peut-être inspiré les pipes de cette forme fabriquées aux Etats-Unis (voir plus haut) est complètement obscure mais doit se trouver en Allemagne, ou du moins en Europe centrale, et ce domaine peut devenir un sujet de recherche distinct.

En Belgique (chapitre 3, section IV), Lefrancq a publié de bons articles préliminaires sur un ou deux aspects de la fabrication des pipes dans ce pays (1970a; 1970b), et l'on a bon espoir qu'il sera en mesure de produire les études approfondies qui ont fait défaut jusqu'ici et de publier sa longue liste de fabricants de pipes belges, du XVII^e^ au XX^e^siècle.

Après avoir ébauché la section traitant de l'industrie française (chapitre 3, section V), l'auteur l'a révisée pour y inclure les travaux de Jean-Léo publiés dans son livre Les pipes en terre françaises (1971). La plus grande partie de ce livre constitue un précieux catalogue raisonné et bien illustré des produits de la fabrique Gambier auquel s'ajoutent les catalogues d'un certain nombre d'autres fabricants, excellement reproduits. L'ouvrage ne fait pas tout à fait honneur à son titre puisqu'il ne constitue pas une étude définitive de l'industrie française de la fabrication des pipes en terre, mais il présente de nombreux faits qui nous étaient inconnus. D'un autre côté, l'auteur dispose d'une foule de données apparemment inconnues à Jean-Léo. La réunion de tout ce matériel, condensé dans la présente étude, pourrait permettre à quelque savant intéressé, d'entreprendre une vaste étude de l'histoire de la fabrication des pipes en France.

A notre connaissance, rien n'a été fait sur les pipes suisses depuis la publication, à la fin du XIX^{e} siècle et au début du XX^{e} siècle, des articles mentionnés au chapitre 3, section VI, dont la majorité tendait à démontrer que les pipes en métal extrêmement intéressantes utilisées à une certaine époque dans ce pays sont d'origine romaine ou semblable. Comme il est indiqué à la section VI du chapitre 3, ces pipes doivent être d'inspiration germano-hollandaise et remontent probablement à fin du XVII^{e} siècle et au XVIII^{e}, mais on ignore tout de leur histoire sociale, de leurs origines, de leur montée, de leur déclin et tout le reste, et il est évident qu'elles constituent un autre sujet de recherche important.

Par contre, les études scandinaves portant sur la fabrication des pipes en Norvège (Pettersen et Alsvik, 1944), au Danemark (Kristensen, 1959) et en Suède (Puktörne, 1968) laissent supposer que les petites industries de ces pays, aussi bien que le matériel de fabrication des pipes lui-même, ont été examinés efficacement. Jusqu'ici, les découvertes de pipes ont donné lieu à peu d'applications archéologiques mais Puktörne signale leur utilité lors des fouilles de Varberg et l'on peut s'attendre à d'autres rapports de découvertes de pipes.

Dans l'ensemble donc, on peut se rendre compte que l'industrie de la fabrication des pipes en Hollande, en Allemagne, en Belgique, en France et en Suisse mériterait bien une enquête étendue.

Le chapitre 4 a été rédigé pour déceler les éléments répétitifs discernables dans les brèves études sur divers centres de fabrication de pipes et pour voir comment ils pourraient se relier à l'étude détaillée de l'industrie de Bristol. Comme la section VII du chapitre 4: "Conclusions", l'indique, cela c'est avéré profitable. En outre, on a recueilli et présenté ici une quantité considérable de données, reliées en particulier au commerce en Amérique du Nord ou avec l'Amérique du Nord et, par conséquent, difficules d'accès pour les lecteurs britanniques, dans l'espoir de constituer une source utile pour tous ceux qui seraient intéressés à se lancer dans des études poussées sur la fabrication des pipes dans n'importe lequel des centres mentionnés. L'industrie de Liverpool (section II, chapitre 4) n'a encore fait l'objet d'aucune étude, et bien qu'on trouve dans G.C. Spence (1942) un exposé étendu sur les fabricants de Chester de même que quelques dessins de marques, il reste toujours à étudier les formes de fourneau, la datation ainsi que l'origine des tuyaux abondamment décorés des pipes de Chester, sans compter le commerce d'exportation (voir chapitre 4, section III). La question de savoir si c'est de Liverpool ou de Chester que vint l'idée de faire mouler sur le tuyau le nom du fabricant ainsi que le lieu de fabrication, reste également sans réponse. (Malheureusement, R. Wilson, qui travaillait sur l'industrie de Chester, est mort en 1968.) On a étudié de plus près de cas de Glasgow, principal fournisseur de pipes en terre pour l'Amérique du Nord au XIX^{e} siècle (chapitre 4, section IV), et l'on a établi une liste de 107 fabricants et fabriques de pipes de Glasgow, en particulier du XIX^{e} siècle voir l'annexe VII). Cette information devrait se révéler d'une grande utilité pour les archéologues en Amérique du Nord, mais peut également inciter à une étude plus détaillée de l'industrie de la fabrication des pipes de Glasgow ou du commerce de Glasgow avec l'étranger au siècle dernier. L'industrie de Montréal (section V, chapitre 4) est particulièrement intéressante du fait qu'elle fut établie par des immigrants irlandais dont la venue au Canada résultait directement de la famine causée par la pomme de terre qui avait sévi en Irlande dans les années 1840; la migration partielle vers Detroit dans les années 1870 est un exemple intéressant de déplacements en masse de commerces et de familles, vers un lieu très éloigné, dans l'espoir d'établir un marché meilleur. La consommation du tabac en Ecosse et en Irlande et ses ramifications socio-économiques constituent des thèmes d'étude particuliers.

Bien que les données présentées au chapitre 5 soient rudimentaires à plusieurs points de vue, elles sont très importantes en ce qu'elles englobent des renseignements sur les prix et les revenus au cours d'une très longue période et pour la majeure partie du pays, ce qui n'avait pas encore été fait, en tous cas pour des objets comme les pipes. Des indications ont permis de formuler quelques observations sur la situation sociale et économique des fabricants de pipes, en particulier du XIX^e^ siècle, au cours duquel l'industrie de la fabrication des pipes se trouvait dans une position économique désastreuse. Il est à espérer que certains éléments du matériel rassemblé seront utiles aux historiens qui oeuvrent dans les domaines social et économique.

L'industrie de la fabrication des pipes de Bristol est étudiée au chapitre 6, et constitue le travail de recherche majeur de cet ouvrage. En combinant une grande quantité de documents inédits ou non étudiés, par exemple les registres des apprentis, les registres des bourgeois, les registres de scrutin et les annuaires commerciaux, avec des données d'enquêtes archéologiques et du matériel de musée portant sur une grande partie de l'Angleterre et sur toute l'Amérique du Nord, on a constitué un schéma cohérent des origines, de la montée, du commerce, du déclin et de l'histoire sociale avec un souci de détails qui n'avait pas été atteint jusqu'ici dans les études sur la fabrication des pipes. Il a été particulièrement satisfaisant de voir des éléments indépendants concorder les uns avec les autres. Par exemple, les registres des apprentis et des bourgeois indiquent une brusque réduction de l'importance de l'industrie vers 1740, et ceci concorde avec des preuves archéologiques d'Amérique du Nord établissant que l'industrie a connu son apogée dans les trente premières années, ou à peu près, du XIX^e^ siècle, de même qu'avec les déductions tirées des registres de scrutin. L'auteur a particulièrement goûté les réminiscences de Bryant (1787) et le compte rendu de 1850 sur la pauvreté d'un fabricant de pipes de Saint-Jude paru dans un numéro de l'Examiner, sans oublier des notes occasionnelles d'humanité, d'humour, de même que celles sur la grivèlerie et la corruption. Les pipes du musée de la ville de Bristol (dont la présence résulte de la rénovation urbaine du début des années 1960 dans la rue Lamb, à Saint-Jude), marquées sur commande de la manière décrite par la fabrique T.J. Corcoran de la rue Lamb dans son annuaire publicitaire de 1892, sont très certainement des produits Corcoran et donnaient de la vie à l'annonce. Elles ont également révélé, de façon inattendue, que les pipes de Bristol étaient écoulées en des endroits éloignés tels que Swansea et Plymouth dans les années 1890, ce qui est surprenant étant donné que l'industrie était alors presque morte.

Un examen des inscriptions portées dans les registres des apprentis et des bourgeois, par période, a établi des modèles révélateurs du déclin progressif du contrôle des corporations et les rapports généraux de l'entrée en apprentissage et la reprise de la liberté, la majorité de ces éléments concordant avec l'étude de Rogers sur les corporations de Bristol (1949) tout en les modifiant occasionnellement. Une analyse des professions des pères des apprentis a fourni dans le domaine social, des constatations utiles; l'examen de la zone d'origine de leurs ancêtres a également contribué à l'établissement de faits sociaux utiles. Dans la mesure du possible, on a comparé les faits de cette nature avec des faits semblables s'appliquant à d'autres groupes sociaux, à Bristol et ailleurs en Angleterre.

L'étude des structures commerciales existant dans le pays et à l'étranger, telles qu'elles ont été révélées par des preuves archéologiques et du matériel de musée, s'est avérée particulièrement intéressante en ce qu'elle a permis de constituer un cas valable pour Bristol, déjà un port établi, ayant de plus en plus tendance à se spécialiser dans certaines activités commerciales outre-mer, puis se spécialisant progressivement dans l'exportation des pipes vers l'Amérique du Nord au cours de la seconde moitié du XVII^e^ siècle, et cessant d'approvisionner le marché assez important de l'arrière-pays, en particulier la région située au-delà du Bas-Severn et de ses affluents de la rive ouest, marché qu'elle avait alimenté au début et jusqu'au milieu du XVII^{e} siècle.

Il était également évident que lorsque l'industrie de Bristol se releva au début du XIX^{e} siècle après avoir sombré dans les années 1760-1770, ce fut sous une génération de fabricants qui semblent n'avoir aucun lien historique avec l'ancien régime des XVII^{e} et XVIII^{e} siècles. La démolition, ces dernières années, de la quasi-totalité des vieux bâtiments de la région de Saint-Jude, aussi bien que l'impossiblité, à cause d'un manque de temps, d'étudier la volumineuse documentation relative à la région, et qui consiste en actes de propriété et autres documents de même nature, ont empêché la poursuite d'une étude approfondie de l'histoire sociale de la région au XIX^{e} siècle, mais on a recueilli assez de faits pour démontrer la pauvreté extrême et chronique dans laquelle devaient se trouver les fabricants de pipes, même à l'apogée de l'industrie au siècle dernier (dans les années 1840 et 1850), sans parler de l'époque de la ruine de l'industrie, dans les années 1860.

Enfin, on trouve à l'annexe IX, un recueil de 705 fabricants et fabriques de pipes de Bristol ainsi que des croquis de leurs produits en aussi grand nombre que leur identification le justifie. Cela devrait se révéler très utile pour les archéologues en Angleterre et en Amérique du Nord, particulièrement en Amérique du Nord compte tenu de l'ampleur du commerce des pipes de Bristol dans cette partie du monde. A titre d'archéologue oeuvrant dans les sites historiques depuis 1962, l'auteur estime qu'il s'agit là d'une section clé car elle a servi à élaborer une grande partie de l'histoire économique traitée dans ce chapitre.

Acknowledgements

It is easy to express thanks verbally at the time; less easy to compose a written list of all those who have, over a period of years, contributed in a wide variety of ways to the study that follows.

The origins of this study date back to 1962 when the writer, with a degree in prehistoric European archaeology, emigrated to Canada to become Staff Archaeologist involved with the restoration of the C18 French Fortress of Louisbourg in Nova Scotia and picked almost accidentally on clay tobacco-pipes as being a topic of moderate ease on which to establish some work to justify his change from prehistoric to historical archaeology.

Five years later, with the idea of pipes as a topic of moderate ease long since shattered, the writer was awarded a Canada Council Doctoral Fellowship to pursue these studies at the University of Bath. To J.L. Cotter, then Regional Archeologist with the Northeast Region of the National Park Service, United States Department of The Interior, Philadelphia; to E.McM. Larrabee, then Senior Archaeologist with the Fortress of Louisbourg Restoration Section of the National Historic Parks and Sites Branch of the Canadian government's Department of Indian and Northern Affairs; and to the late H.G. Omwake of the Delaware Archaeological Society I am deeply grateful for recommendations which enabled me to win the Fellowship, and to Mr Larrabee must go an additional debt of thanks for allowing me to continue work in an environment not always ideal for research (cf Larrabee 1971). Thanks must also go to my present employers, the Research Division of the National Historic Parks and Sites Branch of the Department of Indian and Northern Affairs in Ottawa, for granting two years' educational leave on part-pay to study at Bath (1967-69) and for their tolerance of continued part-time work amid the usual welter of paperwork involved in what became a full-time desk job. In particular, they were responsible for providing typing and production services, and undertook the publication of the thesis in the form which follows.

To mention all those who assisted the writer during his research in Britain and since his return to Canada would be a monumental and probably impossible task. The list of over 240 personal communications in the bibliography of this thesis [almost 320 by the end of 1975] is sufficient proof of the debt owed to fellow-workers on four continents, and I trust all those who find their name listed there or mentioned in the body of the text will accept this as sincere acknowledgement for their generous help. It would be invidious to single out any of these for special mention, yet it would be impossible not to note A.H. Oswald F.S.A. and the late H.G. Omwake who over the years have so generously supplied me with information from their vast store of knowledge and to whom I owe all my background knowledge on the subject; and of the others perhaps L.T. Alexander, D.R. Atkinson F.S.A., G. Hagerty, M.-G. Lefrancq, J.H. McCashion, and P.K. Wells have been particularly generous with their knowledge.

All researchers of Bristol history owe a vast debt to the recently-retired City Archivist, Miss E. Ralph F.S.A., who with Miss M.E. Williams, the present City Archivist, and Mrs S. Lang were unfailingly helpful in providing archival and other source material. Miss Williams in particular answered patiently a protracted series of queries typical of the sort of problems arising after 1969 when the writer was 3,000 miles away from his material. The staff of the Bristol Public Libraries were similarly patient with the same sort of time-consuming queries. At the City Museum L.V. Grinsell F.S.A., M. Hebditch, Miss J.D. Lillico, and M. Ponsford allowed me full access to the museum's extensive pipe collections and provided much other information. R. Barrett, the Archivist at W.D. and H.O. Wills, was equally helpful with the rich collection of Bristol and other pipes held by that company in its private museum. For material included in the updating of this work for publication I am additionally grateful to R. Price of the City Museum and R.G. Jackson, who generously gave me information on exports of Bristol pipes during the later C18 and early C19 from their then-unpublished book and who also supplied other information.

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Of the 84 museums and private collections covered only two were less than helpful, and many were helpful beyond all normal call, generously sending pipes, or photographs specially taken, or drawings, or comprehensive descriptions, and thereby obviating expensive travel on my part. Others went out of their way to find relevant data, while some provided meals and accommodation - a particularly gracious afternoon tea at Topsham comes to mind. To the staff of these museums I offer my sincere gratitude for their asistance which contributed immeasurably to the successful completion of the gigantic task of covering nearly 100 collections.

I should also like to thank the following European museums for their co-operation during study tours there: in France the Musée du Tabac, Bergerac, and the Hôtel Sandelin, Saint-Omer; in Belgium the Musée de la Céramique, Andenne, the Museum voor Folklore, Antwerp, the Museum voor Volksunde, Ghent, the Musée de la Vie Wallonne, Liège, and the Musée de Folklore, Tournai (even though they insisted on charging me admission); in The Netherlands the Niemeyer Nederlands Tabacologisch Museum, Amsterdam, the Museum "De Moriaan", Gouda, and the Pijpenkamer of the Douwe Egberts Tabaksmaatschappij N.V., Utrecht; and in Iceland the Thodminjasfn Íslands, Reykjavík.

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At Bath University R. Robinson of the Library consistently produced miracles in the way of locating and obtaining on inter-library loan many recondite British and European journals and books, while my supervisor of studies R.A. Buchanan showed rare patience with the protracted preparation of a work which I am sure he (and for that matter I) thought at times would never be finished.

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In this published version the photographic illustrations were printed by J. Jolin and G. Taudien; S. Epps drew figs 120, 146-48, 152-55, and 159-66; Miss D. Kappler drew figs 1, 3-7, 105, 129, and 157; and D. Ford, Mrs J. Mousette, and Miss Kappler among them drew fig 156 and the pipe drawings in Appendix IX. A.S.R. MacGregor of Xerox Canada provided copies of some particularly large-sized illustrations.

Sources of illustrations other than photographs in this writer's collections are given at the end of the caption, and I should particularly like to thank the following individuals and organizations for permission to reproduce illustrations without payment: D.R. Atkinson for figs 3, 4, and 157; J.H. McCashion for fig 121; I. Noël Hume for figs 6a, 6b, and 7; A. Oswald for figs 1, 2, and 119; E. Parsons for fig 5; T. Puktörne for fig 129; Miss E. Ralph, Miss M.E. Williams, and E. George for figs 148a and 148b; Bristol Churches Tenements Association Ltd for fig 190; Bristol City Mission for figs 192 and 193; City of Edinburgh Museums for figs 69-72; City Museum and Art Gallery, Bristol, for figs 11, 169-73, 183-84, and 208; City Museums and Art Gallery, Birmingham, for figs 84, 87, and 94; Courage (Western) Ltd, Bristol, for figs 219 and 220; Department of Indian and Northern Affairs, Ottawa, for figs 8 top, 8 btm, 9-10, 36, 117, 122, 128, and 158; Firma P.J. van der Want Azn Zenith Plateelbakkerij en Pijpenfabrieken of Gouda for figs 23 and 39; Nuneaton Museum and Art Gallery for fig 112; Nyt Nordisk Forlag - Arnold Busck A/S of Copenhagen for fig 105; Sprog og Kultur of Århus for figs 58-60; Theodorus Niemeyer N.V. of Groningen for fig 20; and the Ulster Folk and Transport Museum for figs 61-67. In one or two instances it has proved impossible to trace a copyright holder (if one exists): apologies are offered for any unintentional omissions, and corrections will be made if necessary in any future edition.

Of the remaining illustrations, the Frontispiece and Figs 21-22, 24-35, 37-38, 40-56, 68, 73-83, 85-86, 88-93, 95-104, 107-110, 113-16, and 123-27 were taken by my wife Sansoucy Walker and Figs 106, 111, 130-40, 149-50, 179-81, 185-86, 188-89, 191, 194-204, 215-18, and 221 were taken by the writer. Permission to reproduce any of these illustrations should be obtained from the writer.

Lastly, I should like to sincerely thank my wife for putting up with me most of the time during which this outrageously-long epic disrupted our lives (namely, 1967-76).

Preface

In October 1973 the writer submitted for the degree of Ph.D. from the University of Bath a thesis whose size was exceeded only by the length of its title - *Aspects of the Clay Tobacco-Pipe Industry from the Point of View of the Manufacturing Techniques and of the Changing Patterns of Trade and Smoking, and with Particular Reference to the Industry in Bristol*. The present work, which adopts the short title the university requests be impressed in gold leaf on the cover of its theses, is a partly revised and updated version of this work. In its original size it has already made a modest claim to fame, being the direct cause of the university's placing a strict upper limit on the size of theses. As to its present, larger, size, the writer can only plead hopefully with Horace *brevis esse laboro, obscursus fio*.

Various problems combined to prevent the publication of this work immediately after its acceptance by the university, and in an effort to confound the parable about the perils of sewing a piece of new cloth on an old garment the writer endeavoured to keep the work up to date pending some definite decision about is publication. As noted in the Introduction to the Bibliography in the original, the thesis drew on all material available to the writer up to June 1972 and on a number of sources available between that date and December 1972: this published version has incorporated references available to the writer up to October 1974 and a decreasing number available up to December 1975.

Because of deadlines, however, one major unpublished source of information, the manuscript known for convenience as the Bristol Pipemakers' Guild Book (though as will be discussed later it is in fact largely a jotter of apprenticeship and freedom entries) first come across shortly before the original thesis was submitted has had to remain largely unused. A number of references to it have been included, mostly in the first half of this study (that is, Chapter 1 to 5), but time was not available for the long and painstaking task of checking all the apprenticeship and freedom records in the "Guild Book" against those in the Bristol Apprenticeship and Burgess Rolls, the official city records of apprenticeships and freedoms. Although the internal evidence of the guild book entries indicates that they, like the Apprentice and Burgess Roll entries, are not the originals - there is evidence that the Rolls were made up from some original source, either a jotter or scraps of paper, and the same sort of evidence, such as blanks left for dates or names to be inserted later for example, is found in the guild book - a number of entries not found in the Apprentice and Burgess Rolls, whether omitted from the latter or overlooked by this writer, are listed in the Guild Book. In some cases these entries supplied otherwise unknown information on a pipemaker known to have taken his freedom later. More interestingly, there were entries where a number of guild members had signed, and these sometimes gave very useful dates for these pipemakers being active appreciably later than any other sources used by this writer. A particularly interesting example of this is the case of Isaac Evans free 1698, whose only later reference known to this writer when writing his thesis was in 1700/1. On the basis of Evans products, this writer suggested (repeated in the present work) that Evans must have continued working considerably later, perhaps as late as the 1720s: in fact the Guild Book notes him as Master of the Bristol pipemakers' guild apparently in 1710 and has other references to him at this period, and research by a Bristol archaeologist, R.G. Jackson, has provided references to Evans's will being signed in 1712 and proved in 1713, which provides a close approximation for the date of his death. Entries of the greatest interest in the Guild Book are a resolution of 1710 on the sizes of moulds for various pipe styles (discussed in the present work) signed by presumably all pipemakers at that time, and several other, later, resolutions also signed by members of the period.

The Guild Book in fact covers only part of the C18: the first entry is in 1709 and the last guild entry in 1766, though the book was used variously as a diary; as a notebook for items on Bristol history; as a jotter for various "receipts" designed to cure piles, gout, bile, and other ailments as well as poison rats; and from at least 1790 as a household-book by the Joseph Edwards pipemaking family. Some of the accounts deal with the pipemaking business, others with other interests (including the Charity School for Girls in the Parish of Temple) and household accounts. The latest entry noted is one of 1823, the last year in which Joseph Edwards jr is recorded. Joseph jr may have inherited the Book from his father Joseph sr, who became free 1747 and was recorded in 1792 but had apparently died by 1794 (Joseph jr became free 1774). It is possible that Joseph sr may have been one of the last guild officers and kept this Book on the demise of the guild - as noted in the present study, the Bristol pipemaking industry almost died in the last quarter of the C18. The Guild Book is at present in private hands, though a photographic copy is in the Bristol archives; the present owner can add nothing to its history except that it had probably been bought by his grandfather in Bristol. One wonders what other items of the guild Joseph Edwards jr may have had and what eventually became of them.

Although the present work does not make much use of this Book, its contents have been used by Jackson and Price in their recent monograph Bristol Clay Pipes: A Study of Makers and their Marks (Bristol City Museum: Research Monograph No 1; 1974). The authors have also included additional dating evidence for some makers from wills and other documentary sources, and their entries for Bristol makers should be compared to the entries in the present work and the latter updated if necessary (for example, Flower Hunt in his 1671 will proved in 1672 mentioned a son William not otherwise known who may possibly have been the maker in the William Hunt-marked pipe from Taunton noted in this work, though if so he must have left Bristol and sought his fortune elsewhere). However, while the writer has not systematically checked the Jackson and Price entries against his own, there appear to be discrepancies as well as additional facts: the 1722 will identified as that of Robert Tippet III, for example, appears to be that of Robert Tippet II, who had married again, for the 1700 Rent Book entry quoted by Jackson and Price as noting Robert Tippet II mentions a daughter Sarah married to James Anderson, a linen-draper, and the will said to be that of

Robert Tippet III mentions a son-in-law James Anderson (and a granddaughter Sarah Anderson) which indicates that the Rent Book entry and the will must refer to the same person. The problem of who produced the Robert Tippet-marked pipes into the 1760s (discussed in this work) has no light shed on it by Jackson and Price's research.

Mention should also be made of two important new works dealing with British pipes published recently. One is David Atkinson's study of Broseley pipes mentioned in this work as being in press. This has finally been privately published by the author as Tobacco Pipes of Broseley, Shropshire (1975). The other is Adrian Oswald's Clay Pipes for the Archaeologist (British Archaeological Reports 14; 1975), which has an up-to-date list of British pipemakers and much new discussion. It also makes use of this writer's thesis, and thus makes a much more readable source for pipe research than does the present epic.

At the risk of being criticized for self-advertisement, there is also a useful recently-published paper by this writer entitled "The Potential Use of European Clay Tobacco Pipes in West African Archaeological Research" published in the West African Journal of Archaeology vol 5 (1975) 165-93. This is to some extent a resume of this writer's Ph.D. research (the same issue also has another article of interest on pipes, "European Trade Pipes in Ghana" by D. Calvocoressi, pp195-200).

In conclusion, it is this writer's hope that the publication of this work will provide a major source for future clay pipe research and that while details here will inevitably be proved wrong (as indeed some already have been) the bulk of the work will remain useful for a considerable time to come and that the ideas put forward will stimulate other researchers and the data collected will form the base of new studies.

January 1977

Abbreviations

A	apprenticed
A-O	Atkinson and Oswald
Arch. Rev.	*Archaeological Review*, Bristol
B	born
BAO	Bristol Archives Office
BARG	Bristol Archaeological Research Group
BCM	Bristol City Mission
BIAS	Bristol Industrial Archaeological Society
CBA	Council for British Archaeology
COWA	Council for Old World Archaeology
D	died
DAE	*Dictionary of American English*
DNB	*Dictionary of National Biography*
DRO	Dorset Record Office
Enc. Brit.	*Encyclopaedia Britannica*
F	free
fl	flourished, flourishing
HBRS	*Hudson's Bay Record Society*
LCC	London County Council
M	married
NMAS	National Museum of Antiquities of Scotland
N&Q	*Notes and Queries*
OED	*Oxford English Dictionary*
OS	Ordnance Survey
O.S.	Old System (in dates)
PMA	*Post-Medieval Archaeology*
PRO	Public Record Office
PSAS	*Proceedings of the Society of Antiquaries of Scotland*
RCHM(E)	Royal Commission on Historical Monuments (England)
SA	*Statistical Account of Scotland*
SPD	*State Papers Domestic*
Third SA	*Third Statistical Account of Scotland*
VCH	*Victoria County History*

CHAPTER 1

BACKGROUND

SECTION I: INTRODUCTION

The application of archaeology to the study of the recent past is still a new phenomenon. This is not to say that relatively recent sites have not been excavated in the past, or that relatively recent cultural material - ceramics, glass, and metal - has not been studied, but it is fair to say that until recent years the excavation of such sites generally involved little more than the uncovering of ruins often considered adequately documented from historical sources, while the study of cultural material was a slightly esoteric pastime of people whose interest was in the artistic qualities of the objects and not in the study of man which is the fundamental object of history. That this attitude is not dead can be seen in the 1961 presidential address to the Society of Antiquaries of London by Dr Joan Evans, who deplored the fact that the younger school of British archaeologists was more interested in "plans of cow-sheds and a series of sections of the rims of cooking pots" than in taking "the more aesthetic and civilized approach" of the art historian (Dr Evans herself being an art historian) to "historic and well-documented sites" (J. Evans 1961).

In recent years, however, the application of archaeological techniques to post-Roman sites in Great Britain and post-Columbian sites in North America - that is, scientific excavation and the interpretation of the finds using an interdisciplinary approach - has shown that archaeology can add a new dimension to the study of the recent past. Thus in Great Britain the Society for Medieval Archaeology was founded in 1951, the Society for Post-Medieval Archaeology in 1967 (growing out of the Post-Medieval Ceramic Research Group founded in 1963), and the field of industrial archaeology - albeit with little interest in the excavation of sites so far - has been served by an annual conference since 1964 and by a journal which started in the same year, though a national organization has been very slow in appearing agreement to form the Association for Industrial Archaeology being forthcoming only in 1973. In North America an annual Conference on Historic Site Archaeology has met since 1960 and the Society for Historical Archaeology was formed in 1967. The Society for Industrial Archeology (sic) was founded in 1971 largely, one fears, because a quite pointless attack on the concept of industrial archaeology by a then-leading member of the Society for Historical Archaeology, an anthropologist, made it apparent to American industrial archaeologists that they were less than welcome in that society (Foley 1968; Vogel 1969; Foley 1969).[1] Excavation, however, has been only slightly less rare among American industrial archaeologists than among their British counterparts. As a general rule one may subtract five to ten years from these dates to obtain an idea of when those actively interested in these fields first began to consciously feel the need to form a group to foster their interests.

It is, of course, easy to over-emphasize the contribution of archaeology, in the sense of excavation or other fieldwork, to history. Harrington, one of the pioneers in the field of historical archaeology in the United States, has rightly said (1955b: 1124) that excavations of historical sites have made relatively little contribution to history but a considerable contribution to historical data. This writer would go so far as to say that this is probably the most that excavation will ever be able to do. It is the synthesis of this evidence with other material that constitutes living history.

The study of cultural remains, as already noted, has been in the past all too often a field where noble silverware, beautiful glassware, and exquisite porcelain replaced pewter, wine bottles, and coarse earthenware. The result has been until recently an appalling lack of reliable works on much of the everyday material found by excavators of medieval or post-medieval sites - on some of the material even yet little exists; in other aspects, material may still be mis-ascribed or misdated.

To an archaeologist the most valuable material is that which enables him to make meaningful deductions and not that which is aesethetically pleasing (which latter would have to be found in undamaged condition, an extreme rarity on most excavations).[2] Perhaps the most immediately useful item found on C17 and later sites has been the clay tobacco-pipe, for it has proved possible, as a result of recent studies, to obtain unusually accurate dating for these objects, which are sometimes the most common single item found on recent sites.

The most important features about the clay pipe are its fragility and its ubiquity, the latter being in some degree related to the first. The clay pipe is a fragile, cheap, utilitarian object - its length of use is therefore short and its rate of replacement rapid, unlike items which lasted longer because they were stronger or more expensive to replace, or items of value or beauty, or items which were heirlooms. For example, an individual arrested in 1661 and describing the guardroom where some of his captors were smoking recorded "In the chimney of the room I believe there was [sic] two bushels of broken tobacco pipes, almost half one load of ashes" (quoted in Fairholt 1859: 115),[3] an observation which helps explain the vividness of the Flemish saying het regent pijpestelen - it's raining pipestems (Ons Heem 1963: 181 s.v. Folklore van de puupeclub). Bain (1896: 77-8) says that when Tennyson smoked clay pipes last century he had a large box of them in front of him from which he took one, filled it, smoked it empty, and then broke it in two and threw it into another box laid out to receive the fragments.[4] He would then take a second pipe and smoke it likewise, never using one a second time. Again, a household book of Charles Warton who lived near Kingston upon Hull in the time of Queen Anne indicates that he bought 1,000 pipes in a five-year period, suggesting an average use, doubtless including those for guests, of four pipes a week. (There is also evidence that he had some refired, which cleaned them, after use (Sheppard 1902: 4-5, 2nd ed 1912).) Hallgarth (1969: 34) notes that short-stemmed cutties were a great favourite with Grimsby fishermen, who would take 2-3 dozen with them on a fishing trip. As late as 1926 a woman in Hanley, Stoke-on-Trent, who was almost 100 years old, bought Churchwarden pipes regularly every week - and almost used three oz of tobacco a week (Warrillow 1960: 239).

The western European white clay pipe has turned up on sites from Alaska (Barnett and Schumacher 1967: items 227, 244, and 541; Ackerman 1968: 32, fig 12,5; VanStone 1968: 296; 1972: 68-9, 65 pl 13,5) to Arizona (Fontana *et al* 1962: 95-6, 65 illus.); from Labrador (Bird 1945: 143, fig 14) and Hudson Bay (Zacharchuk 1973: 15) to Guadeloupe in the French West Indies (Clerk *in litt.* 10 November 1967), Guyana (former British Guiana) in South America (undated clipping of letter in a January 1975 issue of the Edinburgh *Evening News*), and Ascension Island (Lefrancq *in litt.* 9 March 1972); from the Sudan (Oswald 1960a: 48) to Ghana (Nunoo 1957: 16-17, Pl III; Calvacoressi; MS) to a shipwreck off Cape Town (Oswald *in litt.* 15 July 1971); from Poland (Rutkowska and Żaryn 1955; pls 37-8) to the Faeroe Islands (Føroya Fornminnissavn [Faeroese Museum of Antiquities] Tórshavn, *in litt.* 3 November 1971) to Iceland (Thjóðminjasfn Íslands [National Museum of Iceland] Reykjavík, *in litt.* 2 December 1969; material seen by this writer 17 November 1971) to Spain (Ríos 1913: 279-83); from Australia (Pretty *in litt.* 28 February 1968; Allen *in litt.* 11 and 18 March 1968; Allen and Macknight *in litt.* 29 March 1968; Bickford *in litt.* 12 July 1969; McBryde *in litt.* 29 March 1971) to New Zealand (Atkinson and Oswald 1969: 205) to Easter Island (Oswald *in litt.* 2 January 1969). Literary and documentary sources indicate their export to Italy (Douwes 1964: 367; Coolen 1970: 400), Russia (Corti 1930: 175-6, 1931 ed; Helbers and Goedewaagen 1942: 18), South Africa (Anonymous 1921a; Berry 1963: 4), South America (Coolen *loc. cit.*; Jean-Léo 1971: unnumbered illus. in end section showing Job Clerc advertisement), and Japan (Voisin (ed) [1950]: 14th page).

Clay pipes, like many other items, evolve typologically - size, shape, decoration, and many other features change in response to a variety of causes. From the recovery of pipe-fragments in datable contexts; from the records of pipemakers in parish registers, apprentice rolls, freedom rolls, guild papers, census returns, poll-books, trade directories, from contemporary illustrations, and many other sources; from the application of evidence gained by these means to material in other archaeological contexts not otherwise datable; from, to borrow E.H. Carr's definition of history, the "continuous process of interaction between the historian and his facts, [the] unending dialogue between the present and the past" (Carr 1961: 30, 1964 ed); from all this evidence a picture of the typological evolution of the clay pipe has gradually emerged - largely due to the pioneering work of A.H. Oswald - over the past 20 or so years. A discussion of English pipe typology appears in Section II(a) below.

As a result of Oswald's studies towards his typologies, some of which produced articles included in the sources listed in this thesis, a list of some 3,400 known pipemakers in England had been collected, and this, the vade mecum of all those who work in the field of recent archaeology so far as pipes are concerned, appeared in 1960 (Oswald 1960a; re-issue with updated bibliography but unchanged text 1967).

Prior to Oswald's 1960 paper, a study of the distinctive Broseley industry had appeared (Oswald and James 1955a; 1955b). Subsequently, as the field of post-medieval archaeology expanded and the value of clay-pipe studies to the field became appreciated, other area studies - either of the industry of an area or of pipes found in an area - appeared, some dealing with regional typologies. Here the work of D.R. Atkinson has been particularly important. Studies of the kind outlined have appeared for London (Atkinson 1962a; 1965a; Atkinson and Oswald 1969); Sussex (Atkinson

1958; 1962b; 1964a; 1964b; 1965b; 1966; 1967; 1968; 1970b; 1972e); Marlborough (Atkinson 1965c, rev ed 1969b; 1973) and Salisbury (Atkinson 1971; 1973) in Wiltshire; Shaftesbury (Atkinson 1970c) and Dorchester E. Watkins 1966) in Dorset; Bath (M.B. Owen 1967; Brown and Sneddon 1973; Brown and Brown 1974); Boston (P.K. Wells 1970; 1972) and Lincolnshire (P.K. Wells 1974); Nottingham (Alvey 1973); SW Yorkshire (Lawrence 1974); and the North-East (Parsons 1964). A study of the Broseley industry by Atkinson is at present awaiting publication, and studies by Atkinson of Southampton and Portsmouth pipemakers and by Atkinson and R.H. Cooper of Winchester pipes are in preparation. In the New World, I. Noël Hume (1963: 262 fig 105; 1970c: 303 fig 97) has produced a typology of pipes found in the Colonial and post-Colonial eastern United States. A re-examination and reconsideration of the field by Oswald in the light of ten years' accumulated evidence since his 1960 paper appears in 1970b.

The Oswald material, both his typology and his list of makers, is strongest in its application to southern English pipes; the work by Parsons in NE England, where he found 264 makers compared to 17 listed by Oswald in 1960, is a fair indication of the amount of regional research still needed in certain parts of England, especially in the north. Indeed, in Scotland, there has been no published work on pipemakers at all. In 1970 Oswald could say (1970b: 226, 233) ca.6,000 makers were now known compared to the ca.3,400 of ten years earlier, and this excluded most Scottish, Irish, and NW England makers and was still being added to almost daily. It is fair to say that distribution maps showing density of pipemakers still reflect spheres of archaeological activity as much as those of pipemaking activity (cf the hitherto-unknown industry in the period 1697 to at least 1713 at Whitehaven in Cumberland and incidental references to an unsuccessful earlier attempt to start pipemaking there - Weatherill and Edwards 1972: 161, 168-9).

Works on local pipe industries, or on pipes found in local areas, had, of course, appeared much earlier than Oswald's study - 100 years previously Broseley pipes had been studied (R. Thursfield 1863) though the dates for the makers listed are quite inaccurate. Kingston upon Hull pipes were studied at the beginning of this century (Sheppard 1902, 2nd ed 1912), though unfortunately few bowl shapes are shown. The Bristol industry in the C17 was examined in a paper with a number of illustrations, by J.E. Pritchard, a noted Bristol amateur archaeologist (Pritchard 1923 - Pritchard 1912 is an earlier, unillustrated, resume of his work).

The background to Pritchard's paper is rather curious. In 1900 Hilton Price, then Director of the Society of Antiquaries of London, published a paper on pipes found in London (T.G.H. Price 1900). In this a number of pipes bearing makers' names were misidentified, and Pritchard, from his then-unpublished work on Bristol pipes, was able to correctly identify them. Pritchard supplied much information and a number of drawings of Price, whom he allowed to publish a "supplementary note" based on this as an addition to his previous article. However, Price published under his own name a full article - "Notes upon Clay Tobacco Pipes of the Seventeenth Century found in Bristol" - complete with 17 illustrations (T.G.H. Price 1901). From the copious acknowledgements which Price gives Pritchard it is possible there was a genuine misunderstanding on Price's part, but Pritchard certainly did not intend Price to publish his material as fully as he did, as he makes clear in the introduction to his 1923 article.

With the exception of these two articles, or two versions of one piece of research, little has appeared on Bristol pipes and pipemakers, though in a little-known study of the Bristol-Virginia tobacco trade in the C17 N.C.P. Tyack includes a chronological list[5] of Bristol pipemakers to 1700 taken from the freedom rolls (1935b: 200 and 1935c: 234) in addition to similar lists of tobacco-cutters, tobacco-rollers, and tobacconists (1935b: 197-200). In particular, the industry in the C18 and C19 has never been examined. However, pipes made by the Robert Tippet family - three generations all called Robert - a famous Bristol pipemaking family during the second half of the C17 and the first half of the C18, have been studied by Omwake (1958) and Oswald (1959a), the former article appearing to be the more accurate.

Oswald's study of English pipes (Oswald 1970b: 231, 227 for latest figures and conclusions, cf 1960a: 43-6 for earlier conclusions and 1959c: 202 for figures) suggests that Bristol became the chief export pipemaking centre in the country during the second half of the C17 and held this position until about the middle of the C18 when the number of pipemakers there dropped sharply, Liverpool taking over as the second pipe-producing centre after London. London in the early C19 had a very sharp rise in the number of pipemakers recorded and once more established a clear lead in the trade, similar to that which it had enjoyed during the first half of the C17, but the very small number of London pipemakers recorded for the period 1750-1800 is due in part to a paucity of records for that particular period.

According to I. Noël Hume (1963: 264), Bristol seems to have been the chief exporter of pipes to Virginia from ca.1660 to the end of the Colonial period. A more recent appraisal does not substantially alter this impression: Atkinson and Oswald (1969: 205) note that in the first half of the C17 London appears to have been the major supplier, losing the market to Bristol in the second half of the century; though they also note that at Williamsburg, the capital of Virginia in the C18 until the end of the Colonial period, London pipemakers did continue to have a large proportion of the market. Noël Hume's observation, however, tends to agree with Oswald's earlier comments (1960a: 46) that the decline of the Bristol pipe industry at the end of the C18 can be at least partly attributed to disruption of trade caused by the American Revolution, and suggests that the reason for Bristol's rivalry with London as a production centre despite its much smaller population is its large New World market. If Virginia obtained a large proportion of its pipes from Bristol it is likely that the trade was not restricted to that colony, but involved all English and British colonies in the New World from the Caribbean to Canada, and other areas to which Bristol ships traded. At Port Royal, Jamaica, out of a large number of pipes examined by Oswald covering the period ca.1680-1740, 225 had marks he identified with Bristol makers, 26 with London makers, and two each with Broseley, Kingston upon Hull, and York, while 28 were Dutch (Oswald 1970b: 231). These points, among others, will be examined in this thesis.

Thus a study of the Bristol pipemaking industry, the identification and dating of its products and makers, should, because of the relatively accurate dating obtainable from pipes, be of considerable assistance in dating not only historical sites in the New World and elsewhere but also native sites, which during the Contact period frequently have European material amongst their remains. By the same token British post-medieval sites will also be more accurately dated. The overall result will be an improved chronology not only for sites but also for material - ceramics, glass, or metalwork, for example - at present not always closely datable in its own right. Only by such painstaking cross-dating can much of the material found on historical (and of course prehistoric) sites be dated. As J.D. McGuire remarked in his monumental study of North American Indian pipes (1899: 454); "The trade marks and symbols on [European] trade-pipe heels and bowls are too numerous to mention, though doubtless a study made of them would settle many vexed points in American archaeology."

This study also covers the manufacturing processes used at various times and in various countries to produce clay pipes. This field has never been adequately studied, particularly in the case of Britain. No apology is offered for this extensive section, for the industry is now almost dead, and in any case historians and archaeologists involved in studying cultural material or processes should have some practical knowledge of the mechanics of producing that material or of the machinery involved (I. Walker 1971b: 14; cf Buchanan 1968: 3; 1970b: 282 and 1972b: 24). Further, a close examination of the pipes themselves in the light of evidence coming from their manufacture reveals aspects which help in dating pipes; conversely a careful study of the pipes can give indications of manufacturing technique not previously known from surviving sources.

Lastly, the human aspect, to which all history has to be directed if it is to succeed in its function, has to be considered. The makers, people who existed largely anonymously as do most people of every generation; and the industry, a source of livelihood for those who followed the craft and a part of the community's trade and a supplier of profit to merchants, have to be examined.

It is hoped that this study will, as the surviving evidence permits, investigate these aspects of the subject. If it manages this, and if it opens fresh avenues to future researchers, then it will have succeeded in the task initially mapped out.

SECTION II:
ENGLISH CLAY PIPES AND THEIR DATING

(a) TYPOLOGY

The first attempt to consider English pipes typologically was by A.H. Oswald in 1951 (Oswald 1951). A revised edition of this typology appeared in 1955 (Oswald 1955a), and this was reissued with some minor textual alterations in 1961 (Oswald 1961). Regional typologies have been produced for Broseley pipes (Oswald and James 1955a: 189; revised dating Oswald 1970b: pl 201) and for those produced in Sussex (Atkinson 1964a: pl facing p.73), London (Atkinson and Oswald 1969: 177-95), and NE England (Parsons 1964: 236 fig 1, 4-18, and 239 fig 2,32-3); and as already noted I. Noël Hume (1963: 262 fig 105; 1970: 303 fig 97) has made a typology of pipes found in the Colonial and later eastern United States. These various typologies are shown in FIGS 1-6 (references to illustrations contained in this study are denoted by the word FIG or FIGS in capitals).

As these are discussed by their compilers and the general trends are evident from the drawings themselves, it is not proposed to deal with them here. The major change to note is the introduction of Oswald's types 7 and 9 and the hybrid type 8 ca.1660-80. It has been generally held that the type 9 shape is a result of the influence of Dutch pipes brought into the country by soldiers of William of Orange in 1688, but it is difficult to trace this attribution to its source. Croker (1835: 30) correctly, though not on entirely accurate grounds, attributed these types to William's reign. Lamb (1852: 30-1) appears to have been the first to suggest, from their appearance on camp-sites of William's troops during the English Revolution, a possible Continental origin for these types. Unfortunately, he is either in error or has confused his references to his illustrations, so that the types to which he refers are not those datable to ca.1688 (cf H.E. Smith 1860: 211-2). Smith, Fairholt (1859: 169), and Jewitt (1863: 76-7 and 1878: I, 293, 295) follow the ascription of these pipes to William's reign on the grounds of their discovery in his camps, but do not specifically suggest that they could have been of Dutch origin or inspiration.[6] Possible Dutch prototypes are discussed in 3: II and 6: VII(a)(2) (this form of referencing - 3: II and 6: VII(a)(2) - is a shorthand way of giving chapter, section, sub-section, and other sub-divisions within this work; thus 3: II refers to Chapter 3 Section II). Perhaps allied to this change in bowl form, but possibly occurring independently, the denticulation round the bowl rim begins to be omitted, a point which will be returned to when the manufacturing techniques are discussed.

Certainly the new shape appears to have spread rapidly throughout England, as instanced by type 9 shapes appearing by ca.1700 both in the south (Atkinson 1964a: pl facing p.73) and the north (Parsons 1964: 236 fig 1). In a deposit from Durham known on historical evidence to have been sealed in 1684 one imported example of this style - an early one - and three local transitional types were found (Parsons 1964: 238, 244 and n.44), four years before William of Orange's landing. The import, made by Thomas Hunt, Parsons attributes to a member of the Bristol Hunt family because the bowl had the distinctive Bristol shape of pipes made there in the second half of the C17, but although several Hunts are recorded in Bristol at this time Thomas is not one of them. Atkinson attributes this particular mark (not illustrated by Parsons, seen by this writer at the Autumn Conference of the Society for Post-Medieval Archaeology, Durham, November 1967) to a Marlborough maker of this name and period. This Thomas Hunt worked in Marlborough from at least 1667 to at least 1696, and Atkinson believes that it was he, ca.1685, who first produced the type 9 style (Atkinson 1965c: 87-8, 93-4, rev ed 1969b).

Light may be shed on this point by the time the present study is finished, for Thomas Hunt could easily be a member of the Bristol Hunt family who moved to a fresh market. The occurence in the North-East of West Country pipes of type 9 form this early, whether manufactured in Bristol or Marlborough, is surprising, for the distribution of type 9 pipes in England is initially limited, one area being the West Country (Oswald 1961: 60), and there are some grounds (see 6: VII(a)(2)) for suggesting this type could have started there. Further, type 9 pipes become the exclusive type of English pipe found in the New World, one Bristol version, a heelless variety, becoming an "export only" type (Oswald 1959c: 59-60). As Bristol is held to have been the major centre for sending pipes to the New World this may be significant to a study of the Bristol industry.

(b) STATISTICAL DATING

Two methods for dating pipes based on entirely different ideas may also be noted. One is a system put forward by J.C. Harrington (1954) and expanded by L.R. Binford (Maxwell and Binford 1961: 107-9; Binford 1962). Its advantages and dangers have been discussed by the writer (I. Walker 1965; 1968a; 1970b; 1971c: 88-9, 117-9) but a short description will be given here as there has recently been a renewed flurry of interest and controversy in the system. Basically, Harrington was able to show that from ca.1620 to ca.1800 the bore diameters of the stems of English clay pipes found on North American sites decreased quite regularly, and by use of bar-graphs derived from measuring samples from datable deposits he was able to state proportions for various periods of time (FIG 7). Harrington excluded Dutch pipe material as, while their stem bores may possibly exhibit a similar phenomenon, Dutch pipes appear to have tended to smaller bores compared to English pipes of the same period and therefore make calculated dates later than the true date (Harrington 1954: 3rd page; cf I. Walker 1965: 61; 1968a: 80-1; 1971c: 88-9, 117-9).

Binford subsequently took Harrington's data and produced from it a straight-line regression formula $Y=1931.85-38.26X$ where Y is the desired date, 1931.85 the theoretical date when the bore diameter would reach zero by the formula, 38.26 the slope of the line (the average number of years between each increment - the bore diameters are measured in 64th ins) and X the mean bore diameter of the sample of pipe-fragments measured. The date obtained is the median date of the sample, and in theory the median date of the deposit containing the material. In practice the formula, and thus the bar-graphs also, appears to be accurate up to ca.1765, after which it rapidly becomes too inaccurate to use, the dates produced being too early.

Both these methods have been applied with remarkable accuracy in North America, but some work in England (Whitehouse 1966; Belcher and Jarrett 1972; some unpublished work by the writer) suggest that when applied to material found there these methods can become quite inaccurate, though Atkinson and Oswald (1969: 208-9) have applied the Binford formula to a number of deposits from London with tolerably good results.

The writer is at present collecting further data to re-examine the Binford formula and increase its accuracy, for it appears to be an averaging out of what is in fact a curved line. The late H.G. Omwake had a formula produced by computer from this curved line plus additional dated material which read Y=1929.189-26.818X (Omwake 1967b: 9); while another American colleague doing work on similar lines (Hanson 1971a) suggested the Binford formula was mathematically in error and produced a series of formulae which best fitted various periods within the overall time-span covered by the Harrington bar-graphs. Hanson's paper has been strongly attacked by Binford (1972) who denounce Hanson for not having written him about his data before publishing a criticism of it and for offering him (Binford) "the most patent kind of insult [which] supplies us with a very nice example of the kind of methodological differences separating historians from scientists" - into which former category of peasant he also places this writer (Binford 1972: 235, 234). Binford was, however, forced to admit (pp231-2, 235-6) that his statement of his original theory, and the manner in which he gave - or rather, failed to give - his evidence was responsible for Hanson's deductions that Binford's formula was inaccurately produced. Harrington, as indeed he noted when originally publishing his bar-graphs (Harrington 1954: 2nd page), used material from a number of deposits, some of which were relatively closely dated, to form groups of evidence for wider chronological periods (varying from 30 to 50 years in fact) and Binford had used this original data to compute his formula and not, as one would suppose from reading his accounts, the already-averaged graphs published by Harrington. Unfortunately, Binford did not specifically state this, still less did he present this original evidence; Harrington never published his original data either and now neither Harrington nor Binford can find their notes on it. Hanson in his reply to Binford (Hanson 1972) accepted that his own formulae were no longer relevant in the light of Binford's explanation as to what data the latter's formula was actually based on.

Stimulated by Hanson's first paper, Heighton and Deagan (1972) used data from 26 deposits to present an improved formula. Like Hanson and this writer, they found there was a curved-line regression, though their explanation for this is severely anthropological, being that "Many long-term movements or secular trends in the social and physical environment cannot be adequatly approximated by a straight line" (Heighton and Deagan 1972: 220). They found the curve which best fitted the data was the Compound Interest Rate Curve, and expressed it as follows. A value X is calculated from the equation $x=\frac{\log Y+1.04435}{.05234}$, being the mean bore diameter of the sample to be dated. The date is then calculated by adding 22X to 1600. It appears to this writer that a formula of this sort will eventually produce the ultimately satisfactory date, but Hanson correctly notes (1972: 256) some of Heighton and Deagan's data comes from sites either poorly dated or with inadequate numbers of pipestems: as no formula is better than the data used to calculate it, there is an urgent need to collect the most reliable data in terms of adequately-excavated and -dated contexts and reasonable amounts of stems. It is to be hoped, however, the study does not degenerate into abstract mathematical games (for more technical mathematical arguments and counter-arguments see Binford 1972: 236-49 and Hanson 1972: 255-7; see also tables and graphs in Cresthull 1972).

In The Netherlands, the late F.H.W. Friederich (1964a-d; 1970) evolved a dating method whereby the height of the bowl measured from the plane of the rim to the junction of heel and stem nearer the smoker, the greatest diameter of the bowl, and the diameter of the bowl mouth, all measured in millimetres, are multiplied and the resulting figure fitted to tables, or in the 1970 version four graphs, equating these figures with dates. Essentially, there appears to be a steady increase in the calculated figures as the date of manufacture approaches the present. The graphs cover various periods between 1580 and 1895 and relate to different categories, both typological and chronological, of bowls. One covers English pipes datable to 1580-1605 and is based on English material found in The Netherlands and material illustrated in English publications. Friederich's scheme is difficult to follow, partly because Friederich does not write in a particularly scholarly manner but principally because he does not explain the method clearly and does not give enough corroborative dating evidence for the initially-postulated dating: in particular there is no mention of archaeologically-dated material being used for comparison. Friederich appears to put much reliance in dating from pipes shown in Dutch paintings - which are generally closely datable - and from pipes which either carry a date or commemorate an historical event of definite date (Friederich 1970: passim; cf Oswald 1970b: 232). Whether it is safe to generalize from these dates, particularly when measurements to the millimetre are involved in Friederich's formula, seems dubious; certainly dating to a specific year is unrealistic. However, Friederich has produced a series of typologies of Dutch pipes based on dates derived from his formula and charts, and there is a convenient summary in English of his work in the form of a typology of the major types of Dutch bowls in Atkinson 1972d.

In some cases at least Friederich's dating of English C17 bowls or attributions as to source are wrong; for example, the pipe (1964d: 4 no 16) attributed to Bristol and dated 1720, while certainly English-looking, is of a shape more typical of London and is likely to be pre-1700 in date. However, work by Friederich on English material sent him by Oswald and Atkinson (Oswald in litt. 1 December 1970) indicates that post-1680 English material seems well-dated by his graphs, though C18 English pipe-shapes are quite different from Dutch ones, while pre-1680 material does not fit well, though C17 Dutch pipe-shapes particularly in the earlier half are much closer to English shapes. This writer has not yet applied this method of dating to either Dutch or English pipes found in North America, but in a number of instances has been able to date Dutch material from stratified deposits and to find general agreement with Friederich's dates provided the latter are given a decade or two's latitude either side for length of life of style. So far as he is aware, no pipes from datable excavated contexts in The Netherlands have had this method applied to them; a drawback to its use is that it requires whole or relatively undamaged bowls, an occurrence all too rare on most excavations.

(c) HEELS AND SPURS

There are, of course, other dating elements in clay pipes. The heels or spurs under the bowls at their junction with the stem evolve and change, and this process can, in general terms, be followed from the literature. The heel first appears ca.1620, evolving from a flattened, often drooping, sometimes horizontal or inclined upwards, part below the bowl which seems to have been one of the earliest features of many English pipes. It was presumably designed so that the pipe could be stood upright when not being smoked, and evolves from this feature in Oswald's types 1 and 2, through type 3 to type 4 variants which have the true heel (Oswald 1961: 56-7, 59; cf Fairholt 1859: 163, H. Scott 1917: 153; Pritchard 1923: 171; A. Dunhill 1924: 224) and is usually approximately round but can be angular, oval, or egg-shaped (Sheppard 1902: 15, 1912 ed; H. Scott 1917: 153), rectangular (Jewitt 1878: I, 295; A. Dunhill 1924: 214), or heart-shaped, a form which became standard on Broseley pipes (Oswald and James 1955a: 187-8).

The heels were large, low, and flat, and sometimes took the maker's name or initials. However, during the third quarter of the C17 heels became smaller but more prominent (cf Holme 1688: 271, 1905 ed), and a reduction in their practical value naturally followed. An exception to this trend was at Broseley, where about this time the distinctive Broseley heel, which remained or at least was revived on some types of pipes manufactured there until recent times, evolved and by the end of the C17 was large enough to take three-line stamps with the maker's name (Oswald and James 1955a: 187-90).

Meanwhile, the spur - a pointed protrusion beneath the bowl - had appeared as early as Oswald's type 4d (ca.1640-70), perhaps a development of the idea which resulted in type 4b (ca.1620-50), itself a development of the drooping part beneath the bowl of earliest pipes and already noted.

By about the end of the C17 heels are becoming skeuomorphic, and by the early C18 the heels, while still having a flat base or at least a flattened apex to a spur-like protrusion, are no longer designed for balancing the pipe upright when not in use. As these heels, or spurs as they were now typologically approaching, were now becoming too small to take even the makers' initials, these become frequently placed, particularly in the London area, on either side of the heel or spur with the initial of the first name invariably on the left, generally vertically, when the pipe is in the smoker's mouth (Jewitt 1863: 77; repeated in 1878: I, 295; H. Scott 1917: 134; A. Dunhill 1924: 212-4; Oswald 1961: 56; Atkinson and Oswald 1969: 185). Duhamel du Monceau, writing in France in 1771, noted in classifying pipes that heeled examples came in two forms, "*Pipes à talon ordinaire...& en Angloises, ou du façon Angloise qui ont le talon pointu*" (Duhamel du Monceau 1771: 3), suggesting that the pointed heel, or spur, was regarded in Europe in the later C18 as a distinctively English feature.

Towards the end of the C17, and continuing through the C18 and until the present day, many pipes, chiefly modifications and developments of Oswald's type 9, were made with no heel (Oswald 1961; 60, 61).

Thus it can be seen that an examination of pipe heels and spurs offer only general dating when considered separately from other features; for while large heavy heels generally date only to the C17, pipes with smaller heels, spur-heels, short blunt spurs, long pointed spurs, or no heel at all, all existed from the end of the C17 or earlier and onwards.

(d) STEM LENGTH

Stem length can offer some guidance for dating, but it is extremely rare that complete pipe-stems are found. At Jamestown, Virginia, for example, out of a total of ca.50,000 stem fragments only three of four whole stems were recovered (Harrington 1954: 1st page). Stems increased gradually in length from the end of the C16 when some were as short as 1-3/4 ins and the average length seems to have been ca.3 ins (contra Trevelyan 1942: 200, 315, 1946 ed) into the C18. Average length ca.1630-40 appears to have been 6-1/2 ins, ca.1660-80 10-13 ins, and ca.1700 15-16 ins (Oswald and James 1955a: 188; Harrington 1954: loc. cit.; cf Brongers 1964b: 17 with a 1598 reference to pipes "one finger long" with a bowl the size of a hazelnut; Atkinson and Oswald 1969: 209; and I. Noël Hume 1970c: 296). Early in the C18 the "Alderman" was introduced, (Fairholt 1859: 173; cf Penn 1901: 150 and T.P. Cooper 1907: 108) which had a stem probably up to 18 ins long, designed so that the smoker could rest his arm on his elbow-chair without lifting his hand to steady the bowl (Fairholt loc. cit. footnote). As the C18 progressed the length of pipes increased. (For the use of metal pipes as an alleged substitute for the fragile long-stemmed clay pipes, see Appendix I).

According to some sources (T.P. Cooper 1907: 108; Apperson 1914: 89; A. Dunhill 1924: 219) the still-longer Churchwarden clay pipes appeared in the late C18 or early C19 with stem lengths of 24-28 ins (Jewitt 1878: I, 298; T.H. Thursfield 1907: 163) and up to 33 ins (Chandler 1957: 340-1). Harley (1963: 15) asserts that the Churchwarden was introduced in 1819, but he gives no evidence for this statement and elsewhere in his monograph reveals he is not reliable on all points; he may be misquoting T.P. Cooper (loc. cit.) who said that the Churchwarden came into fashion ca.1819. According to Mackenzie (1957: 199) Tennyson while at Trinity College, Cambridge, in 1828-30 noted "long churchwardens" set on the Combination-room table at Queen's College, but it is not clear whether Churchwarden was a term contemporary with Tennyson's time at Cambridge. G.B. Hughes (1961b: 1634) says that the term Churchwarden dates no earlier than 1840, but like Harley, he is an unreliable source and cites no reference for this date. Although George Sturt records (Sturt 1923: 153, 1963 ed) that the Churchwardens his grandfather used and reburnt for further use (cf p.414 below) when Sturt was a boy had gone out of fashion at any rate in the Farnham area of Surrey when he took over the family's wheelwright business there in 1884, Churchwardens in lengths from 12 to 21 ins continued to be made in Leicester until WW I (Daniell 1965: 61), and a member of the Leigh pipemaking family who were in business at Portchester, Portsmouth, from 1840 until after WW II recalled there used to be many orders for "Churchwarden's fancy pipes" at Christmas (C. Green 1973a). Indeed, 9- and 12-ins Churchwardens are still made by the Manchester firm of John Pollock and Co. These are in great demand in North America, and Mr Clive Southorn of the now-closed firm of Southorn and Co. at Broseley, Shropshire, said in 1968 he could sell any number of Churchwardens were he to start business again.[7]

There is much confusion over the terms Alderman and Churchwarden, and it may be that they were never closely defined. If they were, the original definitions have been lost. For a more detailed discussion of the term Churchwarden, see Appendix II.

However, before 1700 short pipes of the types later known particularly in Ireland as dudeens and in Scotland as cutties had already appeared (Holme 1688: 271, 1905 ed; cf A. Deane 1914: 5 and I. Noël Hume 1970c: 296-7), and these seem to have been used by the lower classes. (The earliest recorded use of the term "cutty" for a pipe is in 1776 according to the OED vol II; "dudeen" does not appear to have been recorded before 1841 according to the OED vol III). Certainly, class differences were reflected in pipe lengths by the end of the C18 in England (Fresco-Corbu 1964: 424) and this appears to have been the case in The Netherlands from the introduction of smoking (Anonymous 1960: 81-2). In 1913 a correspondent reminiscing about pipe-smoking in the 1850s and 1860s (N&Q 6 September 1913, quoted in Mackenzie 1957: 257-8) noted that long-stemmed pipes were smoked in taverns by professional men and tradesmen while the short clay was definitely the mark of the labouring class. However, another correspondent at the same time noted (quoted in Apperson 1914: 163-4) that Sandhurst cadets in the later 1850s much favoured the superior cutties of the London firm of Milo, and yet another correspondent, writing Apperson noted that short clays were favoured "at Sandhurst and the Universities [i.e. Oxbridge]" because long-stemmed pipes were difficult to smoke unless the smoker was seated or otherwise at ease while cutties could be clenched in the teeth and smoked while working (quoted in Apperson 1914:164-5). Labourers, he continued, smoked short clays while out-of-doors and Churchwardens at the inn in the evenings (cf Apperson 1914: 162). Pimlott (1947: pl 13) reproduces a painting entitled "To Brighton and back for 3s 6d" and dated 1859 showing a young man smoking a long straight-stemmed pipe in a crowded train, accompanied by his girlfriend, which is perhaps surprising, both in regard to smoking a long-stemmed pipe in such surroundings and in smoking in female company at all at this time; Pimlott also reproduces a John Leech cartoon of 1851 entitled "A Cockney in Dieppe" (1947: 190) and depicting a typical lower-class individual with a cutty. An 1873 illustration of the inside of a Sailors' Home in East London which appeared in the Illustrated London News (reproduced in Samuel 1973: pl 1) shows two individuals smoking long-stemmed pipes - one of which is certainly a clay but the other of which appears not to be, one smoking a short-stemmed clay, and one - a coloured man, possibly a Lascar - with a cigar or cheroot; and the accuracy of this scene is suggested by the fact that the short-stemmed clay is carefully enough depicted to appear to be identifiable as a Woodstock type (see p.18 and n. 8 below, and FIG 8). However, although people like Thomas Carlyle, 1795-1881, smoked "Churchwardens" (if one may use the term) after the manner of the aristocratic and leisurely habits of an earlier generation (Fleming 1923: 243-7), in general the clay pipe of the average pipe-smoker of last century appears to have been short-stemmed (Anonymous 1856a: 94; Apperson 1914: 184; Hermessen 1926: 326; cf Nicks 1969: 117, 249, citing a Hudson's Bay Company account-book of 1810-11), and the reason was probably ease and convenience as much as cost.

Stem lengths were certainly being used to define types of pipes in Bristol in 1710 on the evidence of an agreement recorded in a Bristol Pipemakers' Guild record book (see Preface) and signed by members of the guild on 10 November of that year, or to be more accurate, there was an agreement made that year to standardize stem lengths for types of pipes, no doubt to lengths already approximately accepted in the trade at any rate among Bristol makers. As the preamble to the agreement put it, "a diversity in the Lengths of the sizes of Tobacco Pipes amongst the Company of Tobaccopipe Makers within the City of Bristol...hath tended to the prejudice and disadvantage of the Members of the same Company in Generall". "Long Pipes" were to measure 16 ins, "Dutch Pipes" 14 ins, "Jamayca Pipes" 13 ins, "Pecked(?) Heeles and Gantletts [sic]" 11-1/2 ins, and "Virginia Pipes" 8-1/2 ins, all measurements being made "from the Heel in the direction of the Point" (see p.109 n 10). Members agreed to "shorten their severall Moulds" to these sizes before 1 December following (i.e. within three weeks), "unsizeable Pipes" being forfeit and a fine of 1s for each gross of such pipes produced being laid down (the types of pipes mentioned are further discussed on p.259, 652, and 655 below).

That this regulation was enforced is evident from a case recorded in the same guild book dated 14 March 1734/5, where William Nicholas, who had taken his freedom in 1730 and was recorded working as late as 1775, was found to have "caused a Mould to be made for making Tobaccopipes of about the length of 24 Inches" in breach of the agreement which he had signed "in this Book" and was duly fined 1s per gross of pipes produced in this mould, though the number of gross involved is not stated. Of extreme interest is an adjacent entry of the same date in which the mouldmaker who had "been employed by the said Society [the guild]" to make pipe-moulds, "having inadvertently made a Mould for Mr. William Nicholas contrary to the said Article [i.e. that defining stem lengths]" promised "in consideration of the said Societies having promised to employ [him] in making the said Moulds for the future" never to transgress again, and bound himself in the sum of "Five pounds of lawful money of Great Britain" for good behaviour. Frustratingly, no signature appears at the foot of the statement so the name of the guild's mouldmaker is not known (there is no signature beside the word "Witness" either, suggesting the written undertaking at any rate may have been cancelled), but it is clear that the guild had an official mouldmaker - presumably a smith or a founder - and this suggests many bowl shapes, as well as stem lengths, may have been the same for different makers' products, a point to be kept in mind when considering bowl typologies, identifications as to maker made on bowl shape alone, and local bowl forms.

The Dutch, with their superior pipemaking tradition, were producing pipes three feet and more in length during the second half of last century according to Jewitt (1878: I, 293 n.); and during visits in April 1969 to museums in Belgium, The Netherlands, and north France this writer saw several pipes and moulds - generally Dutch - where the stem length was one metre (over 39-1/4 ins). Duhamel du Monceau (1771: passim) notes Dutch pipes as long as ca.32 ins and short ones of ca.8 ins, but said the most common Gouda pipes were ca.19 ins in length. Harrington's experience of

Dutch pipes in colonial North America, however, was that they often had shorter stems than English pipes (1954: 3rd page).

(e) STEM THICKNESS

Stem thickness does not appear to be a particularly valid indication of age (cf Rippon 1917: 114). Pritchard (1923: 171) said that Elizabethan and early C17 pipes were thick-stemmed, but Harrington (1954: 1st page), who probably had more material available to him than did Pritchard, notes that very early pipes - those datable to ca.1600 - have slim stems, and that there is then a period of fatter stems, followed by a long period during which stems steadily got slimmer. A. Dunhill (1924: 223) observes that C18 stems are more graceful than those of earlier times; and Atkinson has noted that as the new type 9 bowl shape appeared and developed among makers at Marlborough (1965c: 87, rev ed 1969b) and Salisbury (1971: 181) in Wiltshire from the 1680s onwards, in the case of Salisbury into the later C18, stems became thinner, stem bores tending to become narrower at the same time. Among the thousands of C18 stem-fragments seen by this writer there has been a wide variety of thicknesses, but they are certainly slimmer and more graceful than C17 stems. There is some evidence that Dutch pipes, probably because of their superior craftsmanship, were narrower stemmed in the C18 than their British counterparts, and possibly the short-stemmed cheaper English pipes had thicker stems than the more expensive types (I. Walker 1967c: 189, 192-3; cf Harrington 1954: 3rd page). However, all stems appear to have been made narrower at the mouthpiece than where the bowl joined (I. Walker 1967c: 189, cf Duhamel du Monceau 1771: 23), so stem thickness varies not only with type of pipe but with the part of the stem measured.

(f) STEM CURVATURE

The stems of almost all known C17 pipes appear to have been straight, but a reference to "curved English pipes" does occur in the mid-C17: the Dutch trader Jeremias van Rensselaer wrote home from what is now New York state on 14 June 1658 that he had sold three out of four cases of pipes and that the fourth would have gone had there "been some of those curved English pipes in it too" (Van Laer (ed) 1932: 102) - which also suggests the Dutch were not making "curved" pipes at that time. A. Dunhill (1924: 222-3, figs 218, 219) notes Dutch pipes with long stems curved slightly upwards towards the end datable to the late C17 and early C18. In the C18 and later, long-stemmed pipes are known to have had downward-curved stems (Fleming 1923: 247; A. Dunhill 1924: 219, 221, figs 212, 216), but while it may be safe to say that curved stems found on an excavation are unlikely to be pre-1700 in date there is little more that can be deduced from stem curvature alone.

(g) STEM DECORATION

Initials occur on stems ca.1650, and full names are known by ca.1670 (Oswald 1961: 56). Both are placed on the top of the stem. On C17 examples the name is sometimes spiralled round the stem (Omwake 1965a: 29); later, the name is blocked in two or three lines, a method used in areas as far apart as the North-East in the period ca.1675-1725 - where it is relatively elaborate (Parsons 1964: 245-7, fig 3a) - and Wiltshire and Hampshire in the C18 century (Atkinson 1965c, rev ed 1969b; 1969c; 1970a; 1973). Several Bristol makers in the second half of the C17 bordered their initials with denticulated lines round the stem and filled the remainder of the space between the lines with diamonds (see 6: VII(a)(2)). The use of denticulation as a stem-marking is, however, much more of a Dutch feature and occurs on Dutch pipes by the mid- and late C17 (I. Walker 1971c: 82 and refs; DÜco 1974: figs 1-8, 13A-13B; Andersen 1974: 99, fig 9 middle and lower examples) and on into the C19 at least (Humphrey 1969: 20, 19 fig 13c; also material seen by this writer when visiting Dutch and Belgian museums in 1969). A heavier stem ornamentation is also likely to be Dutch (I. Walker 1971c: 82-5) or, in the C19, German (e.g. Gifford 1940: 123 pl IV, 27).

Generally, decorated stems are not common on English pipes, particularly before the C19 - indeed, Duhamel du Monceau (1771: 4) says one of the differences between "English style" and "Dutch style" pipes is that the former have no stem-decoration. However, ornate decoration is known from Nottingham (Oswald 1959c: 206 fig 41; 1970b: 226, 229, 240, pl 202 lower, cf 1970a: 136, 135 fig 56, 55; Alvey 1972: 30 fig 10; 1973: 39-40 figs 2-3; 1974: 26 Fig 11, 21-26) - in the opinion of this writer there is Dutch influence here - Chester (G.C. Spence 1942: 50 and 53, 51 pl IV; Webster and Barton 1957: 19-21, 24 fig 1), and possibly Oxford (Oswald 1970b: 226, 229, 244, pl 213), all dating to the first half of the C18. A highly-ornate stem marked RICH$^{\text{D}}$/PAIN/DARBY [sic] from Lincolnshire (P.K. Wells in litt. 15 June 1971, drawing seen by this writer November 1973) is presumably a product of the Richard Payne of Derby listed by Oswald (1960a: 87) as taking an apprentice in 1762, and is very similar in decoration to the Nottingham pipes noted above. The same form of decoration also occurs on pipes recovered in the Doncaster area (material seen at Doncaster Museum by this writer October 1973). A similarly-decorated stem with the inscription C(?).WILK/INSON/Camb (H. Scott 1917: 160, 159 fig 18) suggests this style spread SE as far as Cambridgeshire - Wilkinson's dates are unknown, but Oswald (1960a: 98) suggests ca.1820. Derby is 14 miles west of Nottingham, Doncaster 38 miles north, and Cambridge 77 miles SE; further research may reveal an east-central England tradition of marking in this fashion similar, for example, to the Wiltshire-Hampshire tradition of placing the maker's name on the top of the stem near the bowl or the Bristol tradition of putting the name in a cartouche on the side of the bowl (see 6: VII(a)(2)), or the distinctive Lincolnshire practice in the later C18 to mid-C19 of placing the maker's name and place of work round the bowl under the rim (see following sub-section). At Broseley there is some evidence (Oswald and James 1955a: 190, 1955b: 225) that makers' names, often with that of the town, were stamped on the stem from ca.1700 - names round the stem, deriving from the heel-stamps noted in Sub-section (c) above, appear to have been slightly earlier than those lengthwise.

An unusual form of stem-marking has recently been recorded on two fragments from Wiltshire, one in the Salisbury and South Wiltshire Museum at Salisbury and the other found locally there (Atkinson in litt. 19 August 1974). The mark is in relief in an oval cartouche and shows the bust of a man with round the border in small relief letters A: VER . NON. The obvious inference is that it commemorates Admiral Vernon's spectacular capture of Portobello in 1739; if so, this would appear to be the earliest example so far known of what was a standard practice in the C19, the production of gimmick pipes commemorating some popular contemporary event (cf following sub-section and 2: VII). Atkinson (in litt. 30 November 1974) suggests that the Vernon-marked pipe and a similar pipe from Winchester with a company's arms as a heel-mark may have been special orders, the Vernon pipes perhaps for a special dinner commemorating Vernon's victory. The placing of such marks on the stem or heel is unusual - in the C19 the bowl was the standard place for such markings - but as the placing of maker's marks on the stem was a Wiltshire-Hampshire tradition of this period (see above; also 6: VII(a)(2)), the use of the stem for commemorative marks such as the Vernon example would have seemed natural enough. (For further discussion of decorated stems see I. Walker 1971c: 70, 82-5, 111 and 114-5, figs 11, 22, 29-30, 40, 44).)

Before 1800 pipemakers began to mould-mark their pipes with their name and place of work - this may have been first done in Liverpool as early as ca.1760 (see 4: II, also I. Walker 1971d: 19, 22-3) or conceivably Chester (see 4: III) - and this became standard practice during the C19 (e.g. Oswald 1960a: 50; see also 2: VII). In 1891 the United States passed the McKinley Tariff Act requiring all imported goods to bear the name of their country of origin, and in Glasgow at least this appears to have caused pipemakers to replace GLASGOW on their moulds with SCOTLAND. In the C20 this marking has been largely discontinued except when required by law, such as in the above case (Walker and Walker 1969: 135; see further 4: IV). Mould-imparted names are readily recognizable as such; there is no confusion between them and incised or stamped names.

In the C19 it became common for pipes to bear other marks, both on the stem and the bowl. A number of these are instanced when discussing moulds under British manufacturing techniques (see 2: VII), but stems often took the name by which the particular style of pipe was known, for example MINER'S PIPE or BURNS' CUTTY, with or without the maker's name as well. McDougall's of Glasgow, for example, produced a pipe marked WOODSTOCK PIPE on one side of the stem and McDOUGALL on the other (FIG 8 upper); they also produced one marked VOLUNTEER on one side and McDOUGALL GLASGOW on the other (e.g. Jelks 1973: 75; cf I. Walker 1971d: 25). A price-list of pipes produced in Scotland in 1900 (Anonymous 1900) by leading firms listed McDougall still making a "Woodstock Pipe" at that time and also noted the Glasgow firm of Waldie producing the same style, White of Glasgow producing a "Woodstock" and a "Small Woodstock", and Davidson of Glasgow producing an "Old Woodstock", a "New Woodstock", and a "Woodstock" (in that numerical and presumably chronological order, rather curiously);[8] the same 1900 list notes that Waldie and Davidson, besides McDougall, produced a "Rifle Volunteer"[9] pipe and that White produced one called a "Volunteer". Waldie's at that time also produced an "Ohio Pipe", a style which the Bristol firm of Ring had advertised themselves making during the period 1816-49 (see discussion of Ring's Ohio pipes in 6: VII(a)(2) and particularly 6: VII(b)(4), and illustrations in Appendix IX s.v. Ring).

The 1900 list gives ca.2,000 pipe types and styles by name and also by type number - these numbers frequently appear on Glasgow pipes ahead of the maker's name (e.g. FIG 9). Occasionally the number is preceded by a letter (e.g. FIG 10); there are cases of pipe-fragments with the same mould-number and maker's name but a different letter preceding the number, R.L. Wilson (1966: 37) noting White of Glasgow stems from Fort Union III, New Mexico, 1863-91, with 79, J 79, and M 79 on them. Presumably the letters indicated variants within the type represented by the number: FIG 10 shows a White stem marked J 73 and the 1900 price-list has type 73 as "Plain and Carved Cutties". suggesting one number covering different varieties, although White's number 79 is listed simply as a "Carved T.D.". Unfortunately, there are no illustrations with this price-list and it has been so rare that pipes are recovered sufficiently whole to allow the examiner to identify bowl shape or decoration with a mould number that virtually no work has been done on identifying these terms, the meanings of which are now lost with a dying industry. In the case of the 1900 price-list, many of the names given are of course common among the products of more than one maker, but there is still an impressive list of obscure terms (cf, for example, n.9 above. McDougall's "Woodstock Pipe" illustrated in FIG 8 bears on the opposite side to that shown in the illustration the mould-number 50, under which number the 1900 pricelist does list McDougall's "Woodstock Pipe"; FIG 9, as shown, is White of Glasgow's number 68, which the 1900 pricelist calls a "Bent Harp", a name of obvious enough meaning. A number of other names given have meanings which can be guessed at, and a few names, such as a "Dublin", refer to bowl shapes which still exist in today's brier pipe industry, but the vast majority are, and possibly always will be, of unknown meaning. That some names indicated pipes for specific markets is suggested by White of Glasgow having a "Montreal Dublin", a "Maple Leaf", and a "Sir John A." (a reference to Canada's first Prime Minister, Sir John A. MacDonald, who was and is popularly referred to as Sir John A.); more obvious, of course, are pipes which came with thistles, or shamrocks (or both), or slogans such as "Erin go Brach" (McDougall's produced a pipe with the latter name; White's produced a "Home Rule Cutty").

(For a more detailed discussion of types of markings on pipes see Oswald 1970b: 233-5, pls 203-5, 208, 211-2.)

(h) DECORATED BOWLS

These are known from the beginning of the C17, but they are rare before the later C18. They occur in the early and mid-C17 in the London area, in East Anglia - where, however, there is Dutch influence and pipes (e.g. Oswald 1959c: pl 127,A,rt) - and the Midlands (see Oswald 1960a: 50 for details; also Gant 1967a).

Elaborately-moulded pipes with the bowl modelled as Ralegh's head and the stem in the form of a crocodile attempting to swallow him (an allusion to a story about Ralegh which claimed that on one of his voyages he had been attacked by a crocodile which found him so impregnated with tobacco that it let him go) were made in The Netherlands throughout the C17 and are supposed to have been based on English prototypes of ca.1600 (Sleen 1963: 263 rt-hand illus, rt-hand example; Brongers 1964b: 34-5, illus; Friederich 1964c: 59-60, 58 fig 1 second row; 1964d: 3, 1 fig 23; DUco 1974: 2nd-3rd pages, figs 38-46 - Oswald dates them in one article (1970a: 140) to 1620-1740 but in another (1970b: 226) gives ca.1600-50). However, these pipes are extremely rare in England - three or four are known from London (ex info. A. Oswald) and there is one in Plymouth City Museum and another in Blaise Castle Folk Museum, Bristol (FIG 11 lower).

In view of their rarity in England, the general inferiority of those which are known compared to those found in The Netherlands, and the known Dutch superiority in pipemaking, it seems more reasonable to explain the few known in England as attempts to copy a Dutch model rather than English prototypes of the latter (cf Oswald 1970a: 140; Atkinson and Oswald 1969: 195). However, the Blaise Castle example may be Dutch - where it was found is not known, but it is almost whole and came to the museum with the material of J.E. Pritchard, the authority on and collector of Bristol pipes, who had another two incomplete examples in his collection and now in the British Museum. On the left side of the stem is the word IONAS, the N and S being retrograde; and on the right the date 1683. Jonas is the usual form in Dutch for Jonah, the iconography here presumably being Jonah and the great fish rather than Ralegh and the crocodile, and the superior craftsmanship strengthens the supposition that it is Dutch (though admittedly the form Jonas for Jonah does occur also in English). If the pipe is Dutch however, and the date can be taken at face value, Brongers would appear to be correct in saying these pipes were made throughout the C17. To confuse matters thoroughly, however, it appears that copies were being made in the C19 in East London (the Bristol example is illustrated and the style and various finds discussed in I. Walker 1972b; the Bristol example is also illustrated in I. Walker 1972a: illus. opposite p.88).[10]

Brongers also notes "so-called Good Queen Bess pipes" with the bowl apparently modelled to represent Queen Elizabeth, and dates them to ca.1600 (Brongers 1964b: 33, 34 illus lower rt; Friederich 1964c: 59, 58 fig 1 top rt, 59 fig 2; 1964d: 1, fig 25). Elaborately-decorated stem and bowls, the latter depicting Charles I and his queen Henrietta Maria, have been found in London, one in a context of ca.1666 (Oswald 1960a: 52, 51 fig 21, 19; Atkinson and Oswald 1969: 195): a pipe with this depiction would seem more likely to be English than Dutch and could date as early as 1625 when Charles married Henrietta Maria. Holme, who was collecting information for his work by 1649, refers to "Wrought pipes in the head and shank" (1688: 271, 1905 ed) which must mean decorated pipes; and in 1619 the first charter of the Westminster pipemakers' guild in fixing a price for best pipes allowed that ones of "extraordinary greatness or unusuall curiosity of workmanshipp" could be priced higher (PRO C.66/2206 Patent Rolls 17 Jas. I, 5 Oct (No 6)), suggesting decorated pipes were being made this early.

A pipe probably datable to early in the second half of the C17 with the bowl covered in rouletted lines and impressions of a Tudor rose is in the Blaise Castle Folk Museum collections - it also bears a Tudor rose heel mark (FIG 11 upper). (The use of a Tudor rose as a maker's mark appears on English pipes at the beginning of the C17 (Oswald 1960a: 41); and surmounted by a crown it was the mark of the first pipemaker in Gouda, The Netherlands, an Englishman who commenced pipemaking there in 1617 (Helbers and Goedewaagen 1942: 45). The mark continued to be used in The Netherlands until the later C18 (Helbers and Goedewaagen 1942: 201), but it appears to have continued in use in England longer than has hitherto been accepted, for it occurs repeatedly on bowls found in Bristol and typologically covering a period from before 1650 into the last quarter of the C18.) The bowl in FIG 11 upper certainly appears to be English and may have been Bristol made - the occurrence of the Tudor rose on bowls of distinctive Bristol shape

(Oswald's type 6a) suggests their manufacture by an as yet unidentified Bristol maker. A pipe which was apparently favoured in colonial North America was that with the bowl bearing the royal coat of arms. These pipes are not common in England, but those which do occur do so mainly in London and the Home Counties. Although the arms depicted can be as early as those of William III (1689-1702) and Anne (1702-14), American archaeological evidence suggests their production was from the middle of the C18 (at Louisbourg from unknown or undatable contexts I. Walker 1966a: 91, 90 figs 3a-6; at Williamsburg post-ca.1740 Atkinson and Oswald 1969: 207, 197, cf 196 fig 10,F, upper left, 198 fig 11,1; A. Noël Hume 1971) - Oswald (1960a: 52) originally suggested a floruit of ca. 1690-1740 (cf now 1970b: 226, 236).

What may be a variant of this idea is a bowl from Lincolnshire described as having George III depicted on one side and the royal arms on the other (quoted in Whitwell and Wilson 1969: 115 s.v. Stoke Rochford), but at present no parallels to this find appear to be known.

Duhamel du Monceau (1771: pls I-IV) illustrated north French and Dutch pipe bowls with mould-imparted ornamentation, including ones with fluting or ribbing, a decoration becoming common on English bowls from ca.1770 onwards (e.g. I. Noël Hume 1963: 262 fig 105; Atkinson and Oswald 1969: 195-201; cf Anonymous 1770 s.v. Pipe). John Naylor of Boston, who must be the John Naylor apprenticed 1751 in Lincoln to his father James Naylor (A 1724, retired 1787) and free there 1761, was in Boston by 1776, and fluted bowls produced by him and bearing the characteristic Lincolnshire marking of the maker's name and place of work above the fluting and below the rim indicate he was producing pipes with fluted bowls in the later C18 (P.K. Wells 1792: 14, 12 fig 7,1). Further, Naylor was producing bowls with a variety of other decorations, including the coat of arms of Boston (ibid. 12 fig 7, 2-3) - unfortunately, it is not known how long after 1776 Naylor continued to work. Fluted decoration is also common on Danish-made bowls imitating both English and Dutch shapes in the last quarter of the C18 (Kristensen 1959: figs 19-25). According to Friederich's dating of Dutch bowls, examples with fluting and a remarkably C19-looking bowl form are occuring in The Netherlands by the mid-C18 (Atkinson 1972d: 179, 180 fig 80,40).

A distinctively Lincolnshire form of marking, as noted above, was the placing of the maker's name and place of work on either side of the bowl below the rim. Variations included simply having the place of work given thus (e.g. MARKET/RAISEN (sic) and LINC/OLN) or having the words placed in the middle of or at the foot of the bowl sides - this last occurs as early as the version with the words below the rim, John Naylor of Boston noted above as working there by 1776 using both forms (cf P.K. Wells 1972: 12 figs 7,1 and 7,2-3). This form of marking was used by makers from at least the later C18 - pipes marked thus NAYLOR/LINCOLN, presumably products of the James Naylor noted above as retiring in Lincoln in 1787, have been recorded from Lincoln and Bourne, and as indicated above John Naylor of Boston, working there by 1776, and presumably James Naylor's son, was producing pipes in this style, his products being recorded from the Boston area - up to makers in business into the second half of the C19 and as late as 1872; and it is known geographically from makers all over the county from Grimsby to Grantham and Gainsborough to Boston as well as from as far north as Kingston upon Hull in Yorkshire, as far west as Doncaster in Yorkshire (example seen by this writer in Doncaster Museum October 1973) and Nottingham (Alvey 1973: 36 fig 1,11-12) and Newark in Nottinghamshire, and as far south as Wisbech in Cambridgeshire (except for the Doncaster and Nottingham examples, I owe all this information to Peter Wells, who most generously made available to me information from his files).

That this form of marking extended quite widely down the east and south coast is suggestd by its scattered appearance among Essex, London, Sussex, Surrey, and Dorset makers. In Essex, Thomas Balme of Romford and another Thomas Balme (or possibly the same, if his business had branches) in East London produced reeded bowls with the letters T and B on the left and right heel sides and respectively ROMFORD (Harley 1964: 213, pl I) and MILE END (Huggins 1970: 95) below the rim in typical Lincolnshire fashion. The Romford Thomas Balme is recorded 1805-11 (Bloice in Atkinson and Oswald 1969: 217) and the East London Thomas Balme 1805-40 (Bloice loc. cit.), the latter's premises being in Wentworth Place in the Mile End Rd (see 4: VI). In Sussex, John Drape of Brighton, fl 1832-67, and Stephen Leigh of Chichester, fl 1841-55, each used an almost-identical form of elaborately-decorated bowl with their names and places of work round the bowl below the rim (Atkinson 1964a: 77-8, 81 n.6; 1972e: un-numbered pl facing p.38, lower left). In Surrey, William Swinyard of Guildford fl ca.1850 used the inscription SWINYARD and GILFORD (sic) below the rim of a bowl with fluting and leaf decoration (Atkinson in litt. 21 January 1974). The Swinyards were a prolific pipemaking family in London, Sussex, Surrey, and Hampshire last century and into this (cf p.262 below). Finally, the style is also known from two examples from SE Dorset. A fluted bowl with *IM* immediately below the rim is in the Priest's House Museum, Wimborne Minster (not seen by this writer when examining the Wimborne Minster material 1969; illus. in Cooksey MS 2: fig 23 showing left side of bowl - Cooksey confirms (in litt. 22 June 1975) that there is no inscription on the opposite side); while a pipe found in the Poole area bore an armorial design on the bowl and had ISLE on the left side below the rim and BRANKSEY on the right, an apparent confirmation of a local belief that pipes were at one time made on Brownsea Island, known last century as Branksey Island and prior to that by other variants, which lies in the middle of Poole Harbour and had pipeclay deposits (Cooksey MS 1; corrections in Cooksey in litt. 10 October 1975).

The only evidence known at present to connect any of these SE and southern pipemakers with Lincolnshire is a newspaper reference to the death in 1854 at Gainsborough at the age of 28 of Alfred Martin "Late manager to Messrs. Swinyard, pipe manufacturers, Lambeth, London" (P.K. Wells 1974: 3): Martin may have been a local pipemaker who had gone to work in London, for a Henry Martin is also noted by Wells as a pipemaker at Gainsborough 1855-56 (P.K. Wells loc. cit.). Independent invention of this form of marking is always possible, but in view of the enthusiastic manner in which pipemakers plagiarized each other's designs, names, etc (pp164-6 below and refs), it seems quite likely that this specifically Lincolnshire design was adopted, perhaps initially because the coasting trade or the pipeclay trade from Poole brought some Lincolnshire pipes south, as a sales gimmick. At present all the evidence points to a Lincolnshire origin for this form of marking, it being known from nowhere else as early as it is there (i.e. pre-1800).

In the C19 there were countless varieties of decorated bowls, including ones with elaborately-modelled heads, particularly the superb products of the Crop family of East London (see 4: VI). Any popular topic or event was likely to have a pipe produced to mark the occasion, whether Nelson and Trafalgar, the Great Exhibition, music-hall hit-songs, or coronations - or in the case of McDougall's of Glasgow in 1936 with their pipe carrying Edward VIII's profile on the side of the bowl, anticipated coronations. Contemporary figures; figures from history, fiction, or mythology; regimental or similar badges; sporting scenes; even commercials; were all used (see 2: VII). Generally, ornamented bowls can be regarded as dating from the later C18 onwards unless other factors such as basic bowl form or the mark or name of a maker of known date suggest otherwise.

(For a more detailed discussion of types of markings found on pipes generally see Oswald 1970b: 233-5, pls 202-5, 208, 211-2.)

SECTION III:
EARLIEST REFERENCES TO TOBACCO IN THE NEW WORLD

The spread of tobacco and smoking following Columbus's voyages is an extremely complex subject, and would require a separate study in itself. There are few scholarly works on the subject - a number are anecdotal rather than scientific in their approach, and some verge on the fictitious.

Dickson's Panacea or Precious Bane: Tobacco in Sixteenth Century Literature (1954) appears to be the most scholarly work in the field, but deals primarily with tobacco rather than smoking. Ortiz's Cuban Counterpoint: Tobacco and Sugar (1940, 1947 ed) also appears to be a serious study of tobacco but it is confined to events in the Caribbean (Dickson does not list this work in her bibliography). Corti's A History of Smoking (1930, 1931 ed) is the only scholarly study of smoking, as opposed to tobacco, which has appeared this century, but it deals with European events and does not touch on Britain in any detail. Fairholt's Tobacco: Its History and Associations (1859) is certainly the most responsible C19 source on smoking and tobacco, and so far as the former is concerned in its British background the book has still to be superceded by a better survey. Penn's The Soverane Herbe: A History of Tobacco (1901) is in some ways a useful complement to Fairholt as it makes use of later C19 work, but it has neither footnotes nor bibliography, and while this writer can identify many of the sources used a number have not been traced. Further, in some instances Penn's statements do not agree with evidence presented by other writers. In addition, the author is avowedly a proponent of smoking, maintaining that pipe-smoking is the one true method of smoking, and his continual praise of this and the implied superiority of British smoking habits tend to be wearing on the reader. Apperson's The Social History of Smoking (1914) is an excellent source for contemporary comments on smoking in England. Mackenzie's Sublime Tobacco (1957), by another writer who was an enthusiastic smoker, is in a sense a modern Penn. It is sometimes useful as a collection of information from a number of less accessible sources, but some sources are mis-quoted and the author's approach tends to be uncritical; and apart from appending a useful "much abbreviated bibliography" he frequently neglects to cite his sources. A modern critical study of the large amount of literature relating to smoking both in Britain and elsewhere is badly needed.

Heimann's Tobacco and Americans (1960) is an extremely detailed and well-illustrated account of the development of smoking and the tobacco industry in the United States. There is a useful set of references and a selected bibliography, and the work seems accurate, though some statements in the earlier sections are questionable and there are hints of pro-manufacturing propaganda against the harmful effects of smoking. Unfortunately the work is not footnoted, which would have been useful for following up some statements.

The following sections are intended only as a brief survey to give a background to the major study. This and the following section rely heavily on five works - Laufer's Introduction of Tobacco into Europe (Laufer 1924b), MacInnes's The Early English Tobacco Trade (MacInnes 1926), Corti (1930, 1931 ed), Ortiz (1940, 1947 ed), and Dickson (1954). While a good deal of the evidence overlaps there is a surprising number of places where quotations from early sources either disagree as to content or where different parts of the same source are quoted by different authors. The third section owes much to MacInnes; while the fourth is largely based on MacInnes, Tyack's "The Tobacco Trade between Bristol and Virginia, 1600-1700" pts 1 and 2 (Tyack 1935a; 1935b), Herndon's Tobacco in Colonial Virginia: "The Sovereign Remedy" (Herndon 1957), and Heimann (1960: 3rd chapt) - in some cases figures quoted by these authorities disagree.

The first Europeans to observe American Indians smoking tobacco were two members of Columbus's first expedition in 1492, Rodrigo de Xeres and Luis de Torres, who had been sent to explore Cuba. They reported Indians burning dried leaves and inhaling the smoke. None of Columbus's crew appears to have adopted the habit, but some years later Rodrigo de Xeres was imprisoned for several years for smoking.

The first notice of the use of a pipe in smoking tobacco appears to be in 1497, when a missionary, Ramon Pane, described a hollow fork-shaped piece of wood which fitted both nostils and through which priests and medicine men inhaled tobacco smoke as a stimulant. He also recorded Indians chewing tobacco for medicinal purposes, and Amerigo Vespucci two years later recorded the chewing of tobacco to alleviate thirst. In Brazil, Cabral in 1500 noted the use of two-piece pipes made of a gourd and a hollow arrowshaft.

Columbus on his second voyage, in 1493, and Pane a few years later, both refer to Indians taking snuff through a simple tube as part of their religious and medicinal ceremonies.

Cigars were also known: Bishop Bartolomé de las Casas, writing in 1527, describes both Spaniards and Indians smoking them, and Gonzalo Fernández de Oviedo y Valdés, writing the previous year, confirms that by this time Spaniards in the New World were smoking.

Cigarettes, in the sense of tobacco wrapped in a container, are noted by Oviedo in 1518 and by Bernal Diaz del Castillo during Cortés's conquest of Mexico, both referring to a cane tube which was smoked filled with tobacco. By the end of the century corn husk and paper tubes were also being referred to.

Cartier, exploring the St Lawrence in 1534, described Indian pipes - a hollow piece of stone or wood - and the way they were smoked, drawing the smoke through the mouth and expelling it through the nose.

It can thus be seen that by the time of European contact with the New World tobacco-taking in all its forms was extremely widespread.

(A recent study (Switzer 1969) suggests that the smoking of tobacco in pipes, perhaps as a religious rite, originated in coastal California before 4,000 B.C. In this area at least five species of tobacco appear native - Nicotiana trigonophylla, N. palmeri, N. attenuata, N. bigelovii, and N. clevelandii. From there pipes gradually spread eastwards into the rest of the American South-West and into northern Mexico. Pipes are not known much before 500 B.C. in the eastern United States, and in Mesoamerica not until Late Classic or Postclassic times (ca.A.D. 600-1521). Nicotiana rustica, the tobacco grown in the eastern United States prior to European contact, was also was known in the American South-West in prehistoric times, but N. tabacum, the species grown commercially today, did not reach the South-West until historic times. Both these species originated in South America. Cane "cigarettes" are known in the South-West as early as 1,000-500 B.C., though this writer is unhappy about using the term "cigarette" to describe what to him appears to be essentially variants of a pipe. The definition of a cigar or cigarette is conventionally tobacco in a wrapper (a tobacco-leaf in the case of a cigar, paper in the case of a cigarette) which is consumed along with the tobacco when smoked. Tobacco in a cane container does not appear to fall into this definition of a cigarette. Corn-husk cigarettes, however, do fall within this definition of a cigarette, but they do not appear to have reached the South-West until early in the historic period, when they may have come from Mexico.)

SECTION IV:
EARLIEST REFERENCES TO TOBACCO IN WESTERN EUROPE

The introduction of tobacco into Europe appears to be a confused subject. As already noted, Rodrigo de Xeres, one of Columbus's crew, smoked in Spain some years after the historic voyage. It has been suggested that Oviedo and some of his men brought back dried leaves to Spain as early as 1519 - Dickson (1954: 79), while not mentioning the leaves, rejects the story that Oviedo brought back tobacco-plants with him, though her argument is not entirely convincing. However, when rejecting the story that Cortés sent seeds to Spain the same year, she notes that apart from there being no evidence for this story there are no contemporary accounts of tobacco-growing in Spain at this time. The alleged reference to a tobacco-merchant in Lisbon in the second will of Christopher Columbus's son Diego dated 1523 is based on a misreading of a name Antonioto Baco (Mackenzie 1957: 71), but in 1543 the healing properties of tobacco were being recommended by a professor at the University of Salamanca (Corti 1930: 51, 1931 ed).

The earliest introduction of tobacco plants or seeds into Europe appears to have been by Luis de Goes, who brought them to Portugal, probably before 1550 (Dickson 1954: 78-80) - the trading of tobacco from Brazil to Portugal was by this time well-established, for in 1548 there were 16 Portuguese settlements in Brazil and among their exports to Lisbon was tobacco (Dickson 1954: 78 n.96). Indeed, part of the confusion as to the introduction of tobacco appears to lie in the problem of whether it was merely the product that was brought, or seeds or plants. However, as the first accounts of tobacco-growing in western European countries all appear in the decades following ca.1550, it is likely that the actual plant, as opposed to the leaves, was not grown much before the middle of the C16. Dickson rejects the story (Corti 1930: 51, 1931 ed) that Francisco Hernández de Toledo, Phillip II's physician sent to Mexico to study the flora, fauna, and minerals of the country in 1559 returned with tobacco among his 1,200 plants: she points out that this story does not appear until 1648; that the date given - 1560 - is a still later addition; that the most important Spanish work on tobacco, appearing in 1571, makes no mention of Hernández or the date 1560; and that in fact Hernández did not go to Mexico until 1571-77 (1954: 80).

Heimann (1960: 34) gives the first plantings in Belgium as 1554, France 1556, Germany 1559, The Netherlands 1561, and England 1570. Unfortunately the sources for these dates are not given, but they appear to be at least approximately correct, for a source of 1576 (quoted in MacInnes 1926: 28) says tobacco-growing had been attempted in England in 1571, and Matthias de l'Obel, the Dutch botanist, stated in 1576 that tobacco was being cultivated in Portugal, Belgium, and England; Haklyut in 1582 also mentiones its growing in England.

André Thevet, returning from Brazil, later claimed to have introduced the tobacco plant to France at a date shortly after 1555; in 1560 Jean Nicot de Villemain, French Ambassador to Portugal, sent seeds and a plant to the Cardinal of Lorraine, and subsequently sent some with the Cardinal to the French Queen Mother, Catherine de Medici. (The story that Nicot sent snuff to Catherine and that she and her sons Francis II and Charles IV used it to relieve headaches seems untrue, as does the story that the Cardinal largely popularized the use of snuff in France; snuff appears not to have been used in France prior to ca.1625, when it was introduced from the West Indies at a time when France was attempting settlements there (Dickson 1954: 92).) A.H. Dunhill (1954: 102-3, 1961 ed), suggests snuff was probably first brought to Europe by the Dutch in the earlier C17 - the word is apparently an abbreviation of *snuiftabak*, probably through the Dutch and Flemish *snuf* or *snuif* (so *OED* vol IX).

The plant was known under many names - *herbe Medicée*, *herbe de la royne mère*, *herbe Cathérinaire*, among others after Catherine; *herbe du Grand Prieur* after the Cardinal; *herbe de l'ambassadeur* after Nicot. Even the name *herbe angoulmoisine* was coined by Thevet, a reference to his being a native of Angoulême (for these and other names see Fairholt 1859: 45-7; Franklin 1906: 666; Laufer 1924b: 49, 53; Dickson 1954: *passim*; Anonymous 1951: 123-4). However, by 1564 or 1565 the term *nicotiana* was in use (Dickson 1954: 69-70), and in 1573 Nicot in his French-Latin dictionary uses the term *nicotiane* (Laufer 1924b: 50).

Some of the confusion over the initial introduction of tobacco into Europe appears to have arisen from the existence of two principal species of plant in the New World. *Nicotiana rustica* grew on the eastern seaboard of the United States, including Virginia and Florida; *Nicotiana tabacum* grew in the Caribbean area and South America. Thus if Thevet did bring tobacco to France ca.1556 from Brazil he can only have brought *nicotiana tabacum*. It has been commonly said that Nicot, while in Portugal, obtained seeds from Florida, in which case he would have introduced *nicotiana rustica*. Thus the controversy which started in the C16 as to whether Thevet (who bitterly complained that Nicot had usurped his fame) or Nicot should be given the honour of introducing the plant to France could be resolved by saying that each of them introduced one variety. This is the argument put forward by Laufer (1924b: 51-2), but Dickson (1954: chapt IV, esp. pp65 and 77-8) does not believe the plant Nicot introduced was from Florida but would have been of the type brought to Portugal before 1550.

Nicotiana rustica was certainly available to botanists in Europe by the middle of the C16, for it appears illustrated in a work published in 1553 (Dickson 1954: 33-4). It seems very probable that both varieties of plant arrived in Europe from several independent sources, and to try to place any honour as to who first brought them is as impractical as trying to decide who introduced smoking to England, which subject is discussed below. However, Dickson appears to cover all the available evidence - using the unrivalled collection of manuscripts and books in the Arents Collection of works on tobacco in the New York Public Library - and those wishing to examine the question in detail are referred to her book. (For an interesting account of the introduction of "pipe-weed" or "leaf" into the Shire, in which some of the above sources can be detected, see Tolkien 1954: 18-19).

Just what the word "tobacco" (variously spelt) originally meant is not clear. Ortiz (1940: 178, 1947 ed) and Dickson (1954: 26-7) more or less agree, quoting early Spanish sources, that the word referred to the wooden tube, either forked or straight, used for inhaling smoke or snuff from the plant, and/or to the cigars made from the plant. The story that the plant was named after the island of Tobago first appears in 1571 (Dickson 1954: 32) (according to Penn (1901: 8), Columbus gave the island this name because its outline resembles the Y-shaped tube. Another myth often quoted is a connection with Tabasco in Mexico (e.g. Heimann 1960: 27). Oviedo, writing in 1535, specifically says that the name referred to the two types of tube "and not to the plant or the sleep which comes over them [the smokers] (as some thought)", but in the same passage he also uses the term to refer to the dried leaves of the plant, to the smoke itself and (if by "smokes" he means the objects smoked) cigars (Ortiz: 1940; quotation on pp120-2, see also p.178, 1947 ed). Dickson also quotes Las Casas as saying the term meant cigars, and Cubans still call cigars *tobacos* (Penn 1901: 180; Oritz 1940: 178, 1947 ed). About the only point which appears to emerge from this is that the term was not used for the plant according to the earliest Spanish observers. Of the various native names which were recorded for the plant, only that used in Brazil, *petum* (in various spellings) became widespread, entering the French language and still being listed under *pétun* and *pétuner* in the *Dictionnaire de l'Académie française* (8th ed 1932-5). In English it is present in the plant name "petunia", a near botanical relative of the tobacco plant (*OED* vol VII).

SECTION V:
TOBACCO IN ENGLAND

The earliest reference to smoking in England so far noted is to a sailor in Bristol in 1556. The manner of smoking is not described, but it is said that he "did walk in the streets emitting smoke from his nostrils" and that he was chased by a hostile populace for his pains (West (ed) 1953: 27, but the original source is not given, and has so far not been traced, nor has West been able to supply it; it is repeated in Anonymous n.d. [3]: 8) (what may be a conflation of this story and the reasonably-authenticated story that pipes and smoking were introduced into England by Ralph Lane and the returning Virginia settlers in 1586 appears in Graves 1969: 9, where it is claimed that Lane "was the first man to smoke in Great Britain - in 1556"). In view of Bristol's trade-links with Spain (6: VII(b)(1)), it is possible that a Bristol sailor could have brought back cigars from there - had a pipe been used this would probably have been noted, and the reaction of the Bristol population suggests smoking was new to them at that time. Matthias de l'Obel, in a book published in 1570 noted that "You see many sailors, and all those who come back from America, carry little funnels made from a palm leaf or a reed in the extreme end of which they insert the rolled and powdered leaves of this plant" (quoted in Heimann 1960: 25), which describes what is in effect a proto-pipe.

The problem in trying to find precise dates for the introduction of tobacco and smoking into England is that many different people, and not just the famous names whose association (real or imagined) with the introduction has been preserved, must have been responsible over a considerable period of time. Among the many names given are Hawkins, Lane, Keot (or Keat), Middleton, Price, Grenville, Hariot, Drake, and Ralegh (e.g. Fairholt 1849: 50-2 and refs; T.G.H. Price 1900: 225-6 and refs; Penn 1901: 14-17, 57; Apperson 1914: 12-16), with Drake and especially Ralegh being most often given the distinction. Price and Keot are said to have smoked 'segars' of twisted leaves of tobacco (Penn 1901: 180).

However, it is now generally agreed that the earliest introduction of tobacco in any appreciable amount must have been by Hawkins when he returned from his second voyage in 1565, though the first reference to his having done so is not until 1615 (quoted in Dickson 1954: 132), sixteen years after the first attribution to Ralegh (quoted in Dickson 1954: 170) - the former would agree with De l'Obel's observation and the fact that cultivation of tobacco in England was being attempted in 1571 (MacInnes 1926: 28 quoting a source of 1576). Assuming Hawkins did introduce tobacco it must have been nicotiana rustica as he had voyaged to Florida, where it is recorded as early as 1589 that he had observed the natives smoking two-piece pipes comprising a clay bowl and a cane stem. As both smoking and growing tobacco are mentioned almost immediately after Hawkins's voyage it is likely that he and his men introduced both to England. (Unless otherwise noted, references in this section come from MacInnes 1926).

However, Harrison, who died in 1593, describes in his Great Chronologie under the year 1573 both nicotiana tabacum and nicotiana rustica, also mentioning that smoking had become very popular. This was the same year that Drake returned from an expedition to the West Indies, and the tobacco he introduced must have been the Caribbean variety, nicatiana tabacum. It seems likely, therefore, that England, possibly like France, received both major types of tobacco within a very few years. In 1582 Hakluyt could observe that tobacco from the West Indies was being grown in England.

The fact that so many people are often quoted as introducing tobacco is probably explained by many, probably all, of them contributing to either the introduction of the plant or of smoking. Drake returned with tobacco from another successful trip to the Caribbean in 1586. The story told about Ralegh being attacked by a crocodile which was frightened off by smelling tobacco on him has already been noted; the other famous story about Ralegh's smoking, his being drenched in ale or water by a servant seeing him smoking for the first time and concluding he was on fire, has a complex history. It appears in Raleghana for the first time only in 1708 (Apperson 1914: 16; cf Dickson 1954: 172), and must be regarded as apocryphal, for versions of the story, involving other characters, antedate Ralegh's execution in 1618. One version of the story, involving the famous jester Dick Tarlton who died in 1588, appears according to Fairholt (1859: 52) and Apperson (1914: 17) in 1611, though Dickson (1954: 172) gives 1638 as the date. Another version, appearing in a play of 1619 (Fairholt 1859: 53; Apperson 1914: 18), involves a Welshman newly-arrived in London. The earliest-known version involves a native of Kingston upon Hull, and appeared in 1605 (Dickson 1954: 173-4). It thus seems certain that the joke was in circulation long before Ralegh's death and did not originally involve him; indeed it has all the appearance of the traditional stories told about country yokels newly-come to town. (For other stories associated with Ralegh and smoking, and all the places where he allegedly took his first pipe - seemingly second only in number to places where Good Queen Bess slept - see Apperson 1914: 16-22; Dickson 1954: 167-74 and E. Watkins 1966: 217).

It is probably safe to say that Ralegh, a romantic figure and an inveterate smoker, did more than anyone to popularize smoking - there is a reference to this as early as 1599, and James I in his A Counterblaste to Tobacco, published anonymously in 1604 (by which time Ralegh had been disgraced) seems to refer to him when he refers to tobacco being brought in "by a father so generally hated" (Dickson 1954: 170). Ralegh, though he never visited Virginia, was responsible for two unsuccessful attempts to colonize that area; the first, in 1585, returned in 1586 and was commanded by Ralph Lane, the second went in 1587 and after arriving disappeared. Thomas Hariot, the great English astronomer and mathematician (cf C. Hill 1965: 139-44 and passim, 1972 ed) and a member of the first settlement, recorded that the colonists smoked pipes while in Virginia and on their return to England in his A Briefe and True Report of the New Found Land of Virginia published in 1588 and included by Hakluyt in the first edition of his Voyages (The Principall Navigations, Voiages and Discoveries of the English Nation) the following year (Fairholt 1859: 22-3; Dickson 1954: 134). A. Dunhill (1924: 211) cites the Dutch botanist Carl Clusius as quoting Hariot to the effect that the Virginia colonists brought back Indian pipes for smoking and that this was followed by a rapid spread of smoking, especially among courtiers, and by the manufacture of similar pipes in England (cf Oswald 1970b: 232 quoting Exoticorum Libri Decem by De l'Écluse (=Clusius)).

The household account-books of one Sir Edward Darrell for 1589 indicate he bought pipes and tobacco in that year, the latter at 3s9d-5s an oz (J.S. Lindsay 1927: 65, 66, 1964 ed), while Sir Henry Sidney, Lord Deputy of Ireland and father of Sir Philip Sidney, "within about three years of [tobacco's] first introduction to England" paid 3s an oz (Fairholt 1859: 70) - Sidney died in 1586. As at least the former price was appreciably more than an average worker was likely to earn in a week it is clear that however much contemporary observers considered smoking to be all the rage, it must have been confined to a very minor section of the population.

The assertions that smoking was introduced and spread in the later 1580s need not be regarded as a contradiction of the previous references to smoking in the 1570s and earlier: it is extremely likely that the Virginia colonists and Ralegh popularized smoking particularly in fashionable circles, whereas earlier it had been restricted largely to people such as the sailors who were smoking before 1570. By the turn of the century clay pipe smoking appears to have been relatively common everywhere in London - two Germans, Paul Hentzner and Thomas Platter the younger, comment on this in 1598 and 1599 respectively.

In England, as mentioned above, attempts were being made to cultivate tobacco, probably the nicotiana rustica variety, by 1571, and both that variety and nicotiana tabacum appear to have been growing by 1573; the latter, on the authority of Hakluyt, was certainly being successfully grown, and used for smoking, in the later C16. A. Dunhill (1924: 206) states, but without giving a source, that tobacco was being grown at Winchcombe in the Cotswolds as early as ca.1586, but according to MacInnes (1926: 83) the first record of tobacco growing there is in 1626.

In a statute of 1558 Queen Elizabeth was granted a levy on all imported commodities, but it is not until the 1590s that there are records of attempts to levy the tax on tobacco, which suggests that not until that time were there definite efforts to establish a tobacco trade. Partly this must have been due to England and Spain being at war from 1588 to 1604, for Spain controlled the tobacco-producing countries and the tobacco which reached England during these times was either booty from raiding expeditions - that brought in by Drake, for example - or smuggled out. In Cornwall, where a spasmodic tobacco trade has sprung up by 1597, a Flemish and a French ship landed and sold £2,000 worth of tobacco to the inhabitants of Penryn. The Customs official there was roughly handled when he attempted to impose tax on the shipments.

The prices paid for tobacco in the late 1590s and early 1600s fluctuate wildly as the uncertain supply enabled merchants to charge what they thought fit (MacInnes 1926: 35-6). In December 1600 a London alderman writing Sir Robert Cecil, the Secretary of State, noted that at that time "there is [no tobacco] that is good to be had for money" and that his own store of tobacco, most of which for some reason he was sending to Cecil, he had had for six months and had been unable to obtain any in the interval (quoted in T.P. Cooper 1907: 102 and MacInnes 1926: 36). The first official figures on the importation of tobacco appear only in 1602, when 16,128 lb were recorded entering the Port of London that year. As tobacco imports rapidly increased, the cost of tobacco lessened, though Spanish tobacco remained dear and by the end of the C17 had been taxed out of the market. In 1626 eight oz (presumably of colonial tobacco) cost 5s, or 9d an oz (T.G.H. Price 1900: 227, Penn 1901: 68); in 1641-42 a lb cost 16s, or 1s an oz (Morgan 1945: passim); in 1656 two oz cost 1s, or 6d an oz (Penn loc. cit.) (the 1641-42 figure was for tobacco bought by the Marquis of Hertford and was presumably the best to be had, or at any rate the most expensive). By 1681 two lb of tobacco to entertain the Marquis of Worcester and his two sons in Bristol cost only 2s (Latimer 1900: 405), or 1-1/2d an oz. Figures for tobacco imported between the beginning of the C17 and the beginning of the C18 are as follows (taken from MacInnes 1926: 150, 154, 163 and Rive 1926: 60-1):

	Colonial tobacco	Spanish tobacco
1615-16	2,300-1/2 lb	52,764-1/2 lb
1628	269,254 lb	not given
1640	1,300,000 lb	6,000 lb
1689	14,392,635 lb	not given
1693	19,866,048 lb	not given
1697-98	22,737,812 lb	27,058 lb
1709-10	23,305,735 lb	nil

Unfortunately, there is a gap in the records between 1640 and 1689, which prevents any detailed analysis of the spread in popularity of smoking during this period (there is also a gap between 1641 and 1688 in the records of shipments of tobacco from Virginia - see p.43 below). Additionally, the above figures are gross - that is, they include tobacco imported for re-exportation - and are thus not direct indicators of English tobacco-consumption: between 1689 and 1709 the average importation of tobacco was some 28,000,000 lb annually while the average annual consumption in England was 11,300,000 lb, or two-fifths of the total imported (Rive 1926: 61). However, some interesting possible relationships between size of clay pipe bowl and the rise in popularity of smoking in the second half of the C17 can be suggested (see pp76-77 below).

In the 1590s the increasing frequency of smoking produced many pamphlets condemning and praising tobacco and its uses, but it was only with the accession of James I in 1603 that an official policy of discouraging smoking was started. Finding the eloquence of his Counter-blaste falling on deaf ears, and himself in financial difficulties, James adopted a more direct approach in 1604 and levied a tax of 6s10d per lb of tobacco instead of that of 2d a lb which had been in effect (Anonymous n.d. [13]: 1st page) since 1590. Further financial difficulties caused him to raise the tax to 20s a lb in 1608, and in 1615, shortly after having again raised the tax,[11] he decided to make the importation of tobacco a monopoly, and sold it to two Londoners for a sum of £3,500 the first year and £7,000 per annum thereafter; they not only had the sole power to import tobacco but also to name persons for selling it.

While all this probably did bring in more revenue, its more important effects were to stimulate smuggling and home-growing of tobacco. In an attempt to counter the former, it was decreed in 1620 that all tobacco sold had to bear the king's seal and that it should be landed only in London; and in the same year the Virginia Company agreed to pay James a higher duty than that stipulated in their charter if he would suppress tobacco-growing in England and tax Spanish tobacco at double the rate on Virginian.

Neither of these measures prevented illicit tobacco being used in an ever-increasing amount. It took until near the end of the century to suppress home-growing of tobacco, and the attempts to make a monopoly of importing tobacco soon proved a failure. Spanish tobacco was totally prohibited in 1624, but this proclamation had to be revoked in 1626. In 1633 Charles I attempted to control the use of tobacco by restricting its selling to licence-holders. By 1637 there were 2,063 licence-holders in England and Wales, the greatest concentration of whom were in the West Country and the South-West. Devon, with 162, had the most of all; Cornwall had 116, Somerset 101, and Gloucestershire 92. Middlesex, next after Devon, had 119, and the City of London 84; other counties with a heavy concentration were Norfolk with 97, Yorkshire with 92, and Kent with 90 (Mackenzie 1957: 136). The concentration in the Bristol area - Gloucestershire and Somerset - is particularly interesting because a little later in this area an appreciable number of pipemakers is recorded (Oswald 1960a: 43-4, figs 16 and 17). This, together with the concentration of home-growing of tobacco particularly in Gloucestershire throughout the C17 (see below) suggests the local inhabitants were unusually fond of taking tobacco during this period.

The order that all tobacco should be shipped through London was repeated in 1627, and in 1630 and again in 1634 not only was London stipulated but the Custom House Quay was designated the only place where tobacco could be landed. All this, and the royal monopoly, and the prohibition of home-growing, was rehearsed again in a proclamation of 1637, but the next year the London monopoly was withdrawn, and Plymouth, Bristol, Dartmouth, and Southampton were allowed to import tobacco.

This only regularized a previously-existing situation. Ships would put in to West Country ports on account of leakage, real or alleged, and ask to unload their cargoes (e.g. Latimer 1900: 116, 144). In 1619, 671 lb of tobacco were officially recorded as imported at Bristol, but how much this was below the true amount landed can only be guessed at. By 1631 it appears that attempted landings of Virginia tobacco at other West Country ports were being sent to Bristol for shipment by road to London, the orders noting that care was to be taken "that none be imbezelled but that all be delivered into his Majesties Storehouses at his Custome house in London" (Tyack 1935a: 147-8). In Bristol the more straightforward course of heavy bribery was relied upon (e.g. Latimer 1900: 152-3), one official of an investigation committee admitting that he himself, by arrangement with a member of an earlier commission set up to try offenders, had landed 40,000 lb of tobacco at Bristol (Latimer 1900: 152-3). (For a description of tobacco-smuggling in the C17 and C18 and attempts to stop it see Rive 1929.)

The Civil War followed soon after the four ports noted above were allowed to import tobacco, and in the resulting relaxation of law enforcement, other ports began to engage in the tobacco trade.

The port which benefited most from the 1638 decision was undoubtedly Bristol (Latimer 1900: 144). In 1662, fourteen ships landed so much tobacco that there was not enough money in the city to pay the customs, which were estimated at about £12,000.

The run-down state of the navy resulted in large losses among Bristol merchants during the Second Dutch War, 1665-67 - in 1665, the mayor, recording the loss of "another five" ships at a loss to the citizens of £30,000, noted that hardly a ship had escaped the enemy. On the other hand, the Great Plague virtually closed the Port of London in that year: in September, 24 Bristol ships were expected home from Virginia and in November, 30 had sailed for the West Indies with 15 more to follow immediately. In July 1666 the Virginia and Barbados fleets - the former comprising 19 vessels loaded with tobacco and 4 with sugar and cotton, and the latter 13 vessels chiefly with sugar - arrived safely, to bring in £30,000 customs. The ships from Nevis, however, worth £50,000, had been captured. That year, 30 ships were preparing to sail for Virginia and Barbados. Apparently 3,300 hogsheads of tobacco carried in six ships had been captured by the Dutch in 1665 and 1666, while in 1667 nine ships with 6,000 hogsheads had been burnt by the Dutch in the James River, Virginia (Latimer 1900: 334, 245-6). Bristol merchants, their tobacco taxed by the Governor of Virginia to maintain Virginia forts, repeatedly asked the King to see that the forts were kept in repair (Tyack 1935b: 194). However, by 1670 half of the 6,000 tons of shipping owned by the city was employed in the tobacco trade (Latimer 1900: 346) which suggests that whatever losses there were during the war, fortunes could be re-made relatively easily.

In Virginia itself, Bacon's Rebellion of 1676 and the upheavals attendant on it almost paralysed the tobacco trade with Bristol, though only for a short period (Tyack 1935b: 193).

The periods of the War of the League of Augsburg, 1688-97, and the War of Spanish Succession, 1702-13, are full of complaints from Bristol merchants about the inadequacies of the naval convoys that escorted merchant ships and the losses suffered by these merchants from lost or diverted ships. By the second half of the C17, though she was at the height of her prosperity in the tobacco trade, Bristol was losing its pre-eminence in the trade not only to other southern ports but to northern ports such as Liverpool, Lancaster (Moffitt 1925: 136), and Whitehaven, which last port was being developed at this time (Marshall and Davies-Shiel 1969: 22-3, 202-3; 264-5).

The first tobacco imported through Liverpool, with the exception of an apparently isolated occurrence early in the C17 (VCH Lancs IV, 18), was in 1670. In the later decades of the C17 Glasgow merchants were illegally trading with the Caribbean and Virginia in tobacco (e.g. MacInnes 1926: 62; Mackenzie 1957: 151, 210-1) and sugar, or else circumventing the laws forbidding them to trade with the English colonies by trading through Whitehaven (Latimer 1893: 6). In the 1680s tobacco imports to the Clyde averaged under 250,000 lb a year (R.H. Campbell 1965: 40; Youngson 1966: 22), but with traditional Scottish acumen Glasgow merchants took advantage of the impending Union of 1707 to lay in vast stocks of tobacco (which prior to the Union had a lower duty on it in Scotland than in England) which they were then able to ship overland to England following Union and sell at a much lower rate than that charged by the hitherto monopolistic English merchants (cf Rive 1929: 556, 557, 558, 565). Even after the Union permitted direct trade between Scotland and English colonies, however, it was not until 1718 that the first Glasgow-owned ship entered the tobacco trade (Third SA vol 5 (1958) 96). From the 1740s onwards, thanks to the securing of contracts with the French state tobacco monopoly Glasgow reached the height of its power as a tobacco importing and re-exporting centre. In 1775, the year before the American Revolution spelt disaster for the trade and virtually stopped it altogether, the 45 million lb imported by Glasgow represented half of Britain's imports (Marwick 1964: 11; R.H. Campbell 1965: 45). Some idea of the wealth of the famous Tobacco Lords - the Glasgow tobacco merchants - has been given in a recent study (primarily designed for schoolchildren) by Nichol (1966; see also 4: IV).

The abandoning of London as the sole legal port of entry did not, however, greatly reduce abuses in the tobacco trade. Throughout the C17 London tobacconists made strenuous attempts not only to revive London's monopoly of importing of tobacco but also to give London the sole right of processing. In 1686 a Tobacco Bill was drawn up to regulate the entire trade - import, export, manufacture, wholesale, and retail - though it was never adopted. (However, many of its points were subsequently adopted.)

Meanwhile, Spanish tobacco was steadily taxed out of competition: in 1661 it was taxed at 10s the lb while all Colonial tobacco was taxed at 1s8d, and in 1685 the figures were increased to 10s6d and 1s11d respectively. By the end of the C17 very little Spanish tobacco was imported; by 1709-10, none.

The protests of the London merchants and the Tobacco Bill are interesting chiefly because of the insights they give on the methods used to evade customs, none of which, of course, was ever employed by the virtuous merchants of the nation's capital. In Liverpool's first year as a tobacco port a ship which brought in 300 hogsheads paid duty on only 60 after bribing the local official. In Bristol, where perhaps merchants were more sophisticated in their methods by dint of long practice, in addition of understating the number of barrels, advantage was taken of the varying weight of a hogshead - thus two ships which declared between them 800 casks at 250 lb each in fact contained between 1,200 and 1,300 barrels each of 400 lb.

Throughout the C17 complaints about adulterated tobacco, sold at half-price or less, abound. George Chapman in his play A pleasant Comedy entituled: An Humerous dayes Myrth, which appeared in 1599, has an amusing reference to dock leaves being given to a customer in a tavern for best tobacco (quoted in Apperson 1914: 42-43 and Dickson 1954: 188). The use of the plant's stalk was perhaps the most frequent method of making cheap tobacco, but starch, coal, dust, and various herbs were all used to good effect.[I2] One man was recorded as producing 35 lb of smoking tobacco from 10 lb of leaf. The reason such activities flourished was that the profits taken by the government and middlemen made the production of cheap, adulterated tobacco a paying proposition. At a time when good tobacco could not be sold under 1s a lb, adulterated mixtures could be bought at between 4d and 6d a lb. The amount of profit coming to the government and middlemen can be gauged from the fact that in 1671 a proposal to re-introduce the

London monopoly suggested a price of between 1s4d and 1s8d per lb to the customer of which the Virginia planter was to receive 1/2d per lb (Fairholt 1859: 71-2; Penn 1901: 132-3; MacInnes 1926: 64-74).

Even when every concession is made for exaggeration in the accounts of those who opposed smoking and over-statement among those to whom the habit was new, spectacular, and therefore noteworthy, it is difficult to avoid concluding that the spread of smoking was a striking phenomenon of the early C17. Certainly some contemporaries regarded tobacco-sellers as causing social problems akin to those caused by alehouse-keepers and brothel-proprietors: tobacco-sellers' shops, described by one person in the late 1620s as "the rendezvous of spitting, where men dialogue with their noses, and their communication is smoke", were places where fashionable people could smoke all day and achieve a state of befuddlement from the raw and potent weed, while brothel-keepers displayed tobacco pipes for their signs (Bridenbaugh 1968: 195-6). To the Frenchman Sorbière in 1663 it appeared the English were "naturally lazy and spend half their time taking tobacco" (quoted in C. Hill 1964: 123, 1969 ed), though it must be remembered (see 3: III) that smoking, the usual method of taking tobacco in England, was restricted to the lower classes in France and would thus have particularly struck Sorbière as excessive (cf remarks by Jorevin de Rochefort, Treasurer of France, on the prevelance of smoking among men, women, and children at Worcester ca.1670 (quoted in Latimer 1900: 360)).

As already noted, tobacco was being grown in England by the last quarter of the C16; but it was not until the second decade of the next century that home growing came into prominence. In 1615 an anonymous work appeared entitled An Advice how to plant Tobacco in England...with the Dangers of the Spanish Tobacco, telling which type of tobacco was best (nicotiana rustica - apparently because of soil and climate), how to harvest and dry it, and the like (MacInnes 1926: 76-8, 153). It was not until 1619 that James I became worried enough to consider interfering in the matter. In that year the Justices of Middlesex were requested to put an end to tobacco-plantations in the London and Westminster area, partly because tobacco was likely to be detrimental to health, partly because the land now being let at exorbitant rents for this purpose had formerly been used to grow food for the poor. The magistrates were instructed to see that tobacco was planted farther afield from the cities. However, in December of the same year, the growing of tobacco was forbidden anywhere in England and Wales, on the grounds that the English variety was more unwholesome than the foreign variety, and that the turning over of farmland to its cultivation was detrimental to the interests of country people. The next year James came to an agreement with the Virginia Company whereby they paid him a higher duty in return for, among other things, prohibiting home-grown tobacco. The proclamation of 1619 was repeated and the importation of tobacco restricted to the King's patentees, it being noted waspishly that it was better that tobacco "amongst many other vanities and superfluities...from beyond the seas" should be imported than that it be cultivated at home "to abuse and misemploy the soil of this fruitful Kingdom" (quoted in McGuire 1899: 458).

The logical reason for the growth of tobacco-planting in England is, as

MacInnes states, that high taxes and profits on imported tobacco had made it profitable for the home-grown variety to be developed and sold at a lower price; and in view of the extremely heavy tax imposed by James on imported tobacco in 1604, it is unlikely that he would have missed the opportunity to forbid, or at least to tax, home-grown tobacco at the same time had it been appearing in any amount. It is however, surprising that it took 15 years for a royal edict to forbid home-grown tobacco particularly when James was known to have such a strong personal dislike of the plant. Furthermore, it is not until the Virginia Company's vested interests were alleged to be in danger that James acted.

The 1615 work on how to grow tobacco is perhaps indicative of attempts being made to cultivate the plant on a commercial basis for the first time. In this case the 1604 and 1608 taxes on imported tobacco can scarcely have been the stimulation to tobacco-cultivation in England for they would appear to have been too early. However, the 1613 monopoly on importation, coming at a time when the tobacco business could obviously survive heavy taxation, together with the example of Virginia which had just started to export a rapidly-increasing amount of the crop, may have induced people in England to start serious attempts to cultivate home-grown tobacco for commercial purposes. It is probably not coincidence that the Westminster (later London and Westminster) pipemakers' guild was formed about this time, for this too suggests that smoking had become widespread enough to allow the formal organization of related industries such as pipemaking and tobacco-growing.

It must be remembered that references to smoking being all the rage are made by people recording an entirely new phenomenon, and not based on a careful study of the percentage of smokers or the amount of tobacco consumed per capita per year. Further, in 1594 an oz of tobacco cost 3s - about the weekly wage of an average labourer - and about this time 3d a pipeful was the usual charge in inns (Penn 1901: 60, 68). Even in the time of James I, while inferior tobacco cost 10s a lb - 7-1/2d an oz - best tobacco cost 18s a lb - 1s 1-1/2d an oz (Penn 1901: 68). Again, as already noted, the amount of tobacco imported before the Virginia tobacco trade opened was relatively small and fluctuated widely in amount, particularly prior to peace being made with Spain. Initially smoking must have been restricted to courtiers and aristocracy who could afford it and to sailors who could acquire tobacco cheaply. However, by 1614 Barnaby Rich in his Honestie of this Age noted that tobacco was so common that

> There is not so base a groome that comes into an ale-house to call for his pott, but he must have his pipe of tobacco; for it is a commodity that is nowe so vendible in every taverne, wine, and ale-house, as eyther wine, ale, or beare; and for apothecaries' shops, grocers' shops, chandlers' shops, they are (almost) never without company, that from morning till night are still taking of tobacco. What a number are there besides, that doe keep houses, set open shoppes, that have no other trade to live by, but by the selling of tobacco.
>
> I have heard it told, that now very lately there hath been a catalogue of all these new erected houses that have sett up that trade of selling tobacco in London, and neare about London; and if a man may believe what is confidently reported,

> there are found to be upward of seven thousand houses that doth live by that trade (quoted in Fairholt 1859: 75-6, also in Anonymous n.d. [14]: 4th-5th pages; cf Alford 1973: 5).

In 1625 too, a contemporary historian commented that tobacco-shops were more common than either alehouses or taverns (Anonymous n.d. [14]: 5th page). Whatever exaggerations there may be in these reports, it seems clear the early C17 saw a rapid spread in the availability of tobacco and in its smoking.

For the remainder of the century there was a constant battle to suppress the growing of tobacco over much of England. In 1621 James renewed his attempts to suppress tobacco-growing in London, and copies of his order were also sent to the High Sheriffs and Justices of the Peace in Kent, Essex, Middlesex, and Surrey. In 1616 there were reports of tobacco-growing from as far afield as Winchcombe in Gloucestershire, and Lincolnshire. Gloucestershire in particular seems to have immediately become the main centre of the English industry. In 1627 Gloucestershire, Worcestershire, and Hampshire were signalled out for the special attention of an appointed official, and all local Justices were commanded to help him. Forty places in Gloucestershire alone were specifically listed.

That this did not have the desired effect is evident from a royal letter in 1631 - the first of many - to the Justices of Gloucestershire, rebuking them for not enforcing the royal edicts (cf Latimer 1900: 116). From this it is clear that interests in the industry were shared by influential groups and local magistrates themselves. In 1634 the Winchcombe, Cheltenham, and Tewkesbury areas were specifically mentioned, and in the next year attempts to destroy the crop were repulsed with violence. In 1636 violence was threatened again, and in 1637 and 1638 broke out (cf Latimer 1900: 141-2). Local Justices were severely reprimanded for failing to destroy crops and assist royal authorities, yet the next year evasions and resistance from local officials were met with at the same three towns. By 1639, when Charles I had more pressing problems to worry about than enforcing tobacco laws, the plant was being grown in Yorkshire, Lincolnshire, Nottinghamshire, Worcestershire, Gloucestershire, Wiltshire, Warwickshire, Monmouthshire, Kent, Surrey, Essex, and Middlesex.

During the Civil Wars, production, now free of all the royal expostulations about the evils of growing so much tobacco, expanded both in England and in Virginia and Maryland. In 1967, during the demolition of a house in Colchester, an estimated 30 to 40 lb of tobacco, in "hands" of about a dozen matured leaves tied together at the stock, was found. Much was destroyed before the importance of the material was recognized, but the tobacco was identified as *nicotiana rustica* which had been air-cured. It possibly dates to the mid-C17 - material of that period was found in the ruins (Gant 1967b). As already noted, *nicotiana rustica* had been specified as the best species for growing in England, and by 1621 James I was urging the authorities in Essex to supress planting. (A pipe found in a cellar during excavations at New Basing House, Hampshire, in the autumn of 1968 and believed to date no later than October 1645 when the house was destroyed by Parliamentary troops was thought to contain tobacco (*The Sunday Telegraph* 8 September 1968; the owner of Basing House, the Hon P.C. Orde-Powlett, *in litt.* 23 October 1968), but analysis subsequently proved that this was not in fact the case (the Hon P.C. Orde-Powlett in litt. 6 October 1969).)

By 1650, when some degree of order had been restored, the Virginia merchants petitioned Parliament to prohibit English-grown tobacco. Cromwell, however, had a difficult role to play: he was aware of the advantages of the Virginia trade even though that colony was Royalist, but he could not afford to run the risk of trouble in the tobacco-growing countries of England. Thus, while he forbade English tobacco to be grown in an act of 1652, he made little attempt to enforce it. Petitions poured in to him protesting against the act, the Mayor of Bristol said riots had resulted from enforcement officers coming into the area, and in 1653 Parliament allowed growers to sell that year's crop - and that year's crop only - legally (Latimer 1900: 245). This was taken as the thin edge of the wedge and 1654 saw a larger crop than ever planted.

This impelled the Virginia merchants and others interested in the colonial trade to fresh efforts to suppress English tobacco. Bristol members went to Parliament with instructions to prevent the growth of English tobacco, which was to the "extraordinary prejudice" of local trade and was "daily brought into this city" (Latimer 1900: 251). A petition was presented, and the government gave way, issuing an immediate order for the destruction of English tobacco. In Gloucestershire, the people of Winchcombe raised 300 horsemen and foot soldiers to repulse the officials and troops sent to enforce the order, but other growers petitioned Cromwell for one more year's grace, and this was given them. The following year Winchcombe petitioned Parliament and again the act was suspended. (It should perhaps be noted that at this time Winchcombe was an important town and a borough - Cheltenham, by contrast, was only a small town.)

One reason for the constant suspending of the act was that Royalist agents were busy in the disaffected areas - letters in 1656 to Charles II in exile averred that 1,400 men of Bristol were ready to march within four days of the king's landing; Gloucester was said to be ready to throw open her gates to him and 600 tobacco-planters in the neighbourhood were ready to support him (Latimer 1900: 266).

In 1657 crops were once again grown in the Winchcombe area. Again the local inhabitants went to arms and again attempts to destroy the crop were unsuccessful; the same things happened in 1658. One of those in charge of the troops that year reported that he and 36 horsemen tried to destroy crops at Cheltenham but found the field guarded, the townsfolk spoiling for a fight, and the local officials conveniently absent. Cheltenham then was clearly not the respectable spa of today. The mob was ordered to disperse, but refused. While the matter hung in the balance, 200 locals arrived from Winchcombe and the troops were obliged to retreat. The same person also records that some of the country troopers were planters and dealers, and that the local Justices hindered rather than helped him. Ten men, he said, could not have destroyed in four days all the tobacco in the Cheltenham area.

The restoration of the monarchy, however, did not improve the lot of the home producers of tobacco. In 1661 yet another act to forbid home-grown tobacco was approved, this time also applying to tobacco-growing in Ireland, hitherto exempt (Fairholt 1859: 115). In 1662 the Governor of Virginia and others interested in the Virginia and Maryland trade petitioned Parliament that the bill be immediately put into effect, and the Farmers of the Customs the same year urged the implementation of the bill on grounds of large losses in customs dues (cf Latimer 1900: 317). The officials of Gloucester, Worcester, and Hereford, however, proved extremely reluctant to enforce the act when ordered to do so. It was reported that the militia were again to be used to destroy the crops, but so ineffective was all this that in 1663 the crop was being grown in Monmouthshire and Oxfordshire as well. Renewed agitation from the Surveyor of the Farmers of Customs and colonial merchants and planters resulted in another bill which pronounced heavier penalties. 1664, however, saw no more success, Winchcombe and Evesham resisting violently so that troops were called for. The next year events proved that not even troops with the county levies were sufficient to handle the situation, which clearly indicates the extent of the industry and its profitable nature.

In 1666 there were riots in Cheltenham and Winchcombe district and the Sheriff of Gloucester almost lost his life. The crop by now was being grown in Warwickshire and Brecknockshire as well as the others listed earlier. The next year Essex and Yorkshire were included; and Bristol petitioned the government about home-grown tobacco interfering with its American trade (cf Latimer 1900: 339-40). In 1668 Flintshire and Shropshire were added to the list.

The 1670s and 1680s are filled with the by now familiar repetitions and strengthenings of Parliamentary acts, and yearly attempts to destroy the crops. Troops were sent on several occasions and violence broke out. Wiltshire and Lincolnshire appeared on the list of counties; Gloucestershire and in particular the Winchcombe area were still the worst offenders. In the 1680s troops were sent out nearly every year, and it seems this finally did have the effect of discouraging tobacco-planting, for during this period the industry (for such it was) declined rapidly, and appears to have died in the 1690s. English-grown tobacco may not have been so rank as it was sometimes accused of being, for in the second half of the C17 Virginia tobacco was becoming cheaper and it is difficult to explain the widespread growth of the plant and the tenacity of its planters solely in terms of cheapness (cf MacInnes 1926: 102). However, it does seem reasonable to suggest that the ultimate demise of the home tobacco industry was assisted by the growing specialization in, and better climate for, curing tobacco in the American colonies resulting in a (relatively) milder product.

It is not coincidence that before 1700 snuff-milling appears in Wiltshire and continued until the 1960s, Devizes becoming one of England's principal snuff-making centres. Tobacco is still manufactured in the county (W.E. Brown 1959: 240-2; K. Hudson 1965: 211, 1968 ed). Clearly tobacco had become such a profitable business that it was worth importing it into the area, when local growing had been abandoned, in order to continue the business.

However, outside SW England tobacco-growing appears to have continued, or at least to have been subsequently revived. According to Fairholt (1859: 4, 143-4) tobacco was grown extensively in parts of Yorkshire - the Vale of York and the North Riding (Ryedale in particular) being mentioned - into the last quarter of the C18. In Ryedale, tobacco-growing by a person formerly employed in the business in Virginia was carried out in a most sophisticated manner. Because the acts of the English parliament in the C17 against tobacco-growing did not affect Scotland, the area around Kelso and Jedburgh in the Borders was producing tobacco during the American Revolution, when trade with the colonies was disrupted; this was stopped by an act of the British parliament in 1778 which limited the amount grown to no more than would occupy half a rod of ground and the uses to medicine and as an insecticide (Fairholt 1859: 4). Curiously, the same act revoked the law forbidding the growing of tobacco in Ireland in force since 1661 (Fairholt 1859: 4, 144), but growing was once more forbidden in 1828 - it was never grown in Ireland to any extent, unlike its botanical relative the potato.

Between 1886 and 1889 unsuccessful attempts were made to grow tobacco of an acceptable quality in Britain. During the first decade of this century financial inducements were made to tobacco-growers in Ireland, Scotland, and England, the prohibitions on tobacco-growing in these countries being rescinded 1907-10, but with little success, and the schemes were abandoned in 1923. Between the world wars the government of Eire encouraged the production of home-grown tobacco, but it proved unpopular with Irish smokers and the scheme was eventually abandoned. In April 1948 the British government permitted amateur home-growers to produce small amounts of tobacco for personal consumption free of duty; later they were allowed to have up to 25 lb of dry leaf cured co-operatively without paying duty (Mackenzie 1957: 145-7).

SECTION VI:
THE 17TH-CENTURY COLONIAL TOBACCO TRADE

The permanent settlement of Virginia began in 1607 at Jamestown, and three years later John Rolfe, future husband of Pochahontas and newly-arrived from England by way of a shipwreck on Bermuda, began experimenting with the local tobacco plant, nicotiana rustica. Rolfe appears to have been the first settler to do so - Captain John Smith, the founder of the colony, states that none of the native crops, not even tobacco, was planted at first - and in view of the privations suffered by the early colonists, particularly during the "starving time" of the 1609-10 winter, food production must have occupied every settler's mind.

This being so, it is perhaps surprising that Rolfe should have immediately experimented with tobacco, and continued to do so for three years. Possibly he was intent on producing a commodity profitable to the Virginia Company. He must have been aware of the popularity of tobacco in England; Heimann (1960: 47) says that Rolfe was a confirmed smoker before going to Virginia. Finding the local tobacco poor in comparison to that grown by the Spaniards and sold at a high price in England, he experimented in 1611 and 1612 with nicotiana tabacum seeds brought from Trinidad and Venezuela. In 1613 he sent his first crop to England and a spectacular increase in demand followed - 2,300 lb were exported in 1615; 20,000 lb in 1617; 41,000 lb in 1618. From this, the figures increased fairly steadily until 60,000 lb were exported in 1622. In 1626, however, the amount exported had jumped to 500,000 lb, and in 1629 to 1,500,000 lb. During this period the price per lb remained between 2s and 3s, but by 1630 over-production had caused the bottom to fall out of the market, and while 1,500,000 lb were exported the price was but 1d a lb. It rarely went above 2d a lb for the rest of the century, though the weight exported rose to 20 million and more lb a year. Unfortunately, figures for the amounts of tobacco shipped from Virginia are not available for the period between 1641, when 1,300,000 lb were shipped, and 1688, when 18,295,000 lb are recorded (Herndon 1957: 47). In 1693 the amount of tobacco imported into England was 19,866,048 lb (Rive 1926: 61); in 1697 the amount exported by Virginia was 22,000,000 lb (Herndon 1957: 49). In the following century Virginia production climbed fairly steadily until the Revolution - before and after this between 50 and 60 million lb were being exported. The prices, however, seldom rose beyond a few pennies a lb until towards the end of the C18 (Herndon 1957: 1-3, 46-9).

(Laufer (1924b: 18, probably quoting Penn 1901: 207) states that the tax imposed by James I in 1604 nearly ruined the Virginia tobacco trade, and that in 1611 English imports of tobacco from Virginia fell to one-sixth, or 142,085 lb. This is clearly in error, for Virginia, as already noted, was only founded in 1607 and her tobacco trade with England only started in 1613. Penn gives his source - a rare occurrence - as "Stith": presumably this is William Stith's The History of the First Discovery and Settlement of Virginia, first published in Williamsburg, Virginia, in 1747 and subsequently appearing in another edition in London in 1753[13]).

In the 1620s attempts both by colonial officials and by James I to base the colony's economy on a wider foundation had failed, and the slump of 1630 was the direct result of over-planting of tobacco glutting the market. In 1639, all inferior produce and half the good was burnt in order to reduce the total to the 1,500,000 lb level of 1630, but this gave only temporary relief. Having committed itself to the tobacco industry, however, the colony took the only course open and expanded its production as rapidly as possible in order to recoup the drop in price by sheer volume of exports. Thus planters pushed westwards to find fresh land, or added to their bulk shipments with dirt, straw, or scrap. The big slave-manned plantations first appeared ca.1690. Periodic attempts throughout the century to widen the Virginian economic base fell on deaf ears (MacInnes 1926: passim; Rive 1926: passim; Herndon 1957: passim; Heimann 1960: 3rd chapt passim).

In the preceding section it was noted that Spanish tobacco was imported during the C17 but that by the end of the century it had been taxed out of the market. For economic reasons, and at the urging of the Virginia Company, James issued two proclamations in 1624 and 1625 forbidding the importation of tobacco from other than Virginia and the Somers Islands (Bermudas); and in 1625 Charles I ordered all foreign tobacco in the country to be exported forthwith and instituted a royal monopoly of purchase. However, Spanish tobacco was held to be so much better than Virginia and was so much smuggled that in 1626 50,000 lb were permitted into the country and this was made an annual concession. Renewed Virginia pressure rescinded this permission, but by December 1627 the impracticability of enforcing a ban on importing Spanish tobacco was realized and the annual allowance of 50,000 lb reinstated (MacInnes 1926: 158-60; McGuire 1899: 459).

It has been estimated that in 1697 seven-eighths by value of English colonial trade was with sugar and tobacco colonies, and of this tobacco occupied by far the larger proportion (G.L. Beer Old Colonial System vol I chapt 1, 41-2, quoted in MacInnes 1926: 135-6). This of course involved more colonies than Virginia, though that colony was by far the most important. Maryland, where tobacco had been grown since the 1630s, similarly depended on tobacco for its prosperity, and tobacco had been grown in Bermuda from the 1610s. It was also grown in the various English possessions in the Carribean. By 1674 Carolina was producing ca.1,000,000 lb annually (MacInnes 1926: chapt VI). However, as late as 1792 Virginia supplied more than half of the tobacco exported by the eastern United States from Massachusetts to Georgia (Fairholt 1859: 321).

During the second half of the C17 there are numerous complaints sent to England not only about English-grown tobacco but about the poor prices generally and the losses suffered during wars from reduced trade and captured and sunk cargoes. Pleas were made for a law to prohibit planting in certain years so that the backlog could be used, but this was never put into effect, partly because of the selfishness of colonial planters and partly because England did not wish to lose a large part of its annual revenue from tobacco customs by such an act (MacInnes 1926: chapt VI; Tyack 1935b: 195). (For a survey of duties levied on tobacco from 1590 to 1968 see Anonymous n.d. [16].)

SECTION VII: METHODS OF TAKING TOBACCO

(a) INTRODUCTION

Smoking was, of course, not the only means of taking tobacco - snuffing and chewing are as old as smoking - nor is the clay pipe, or indeed any other type of pipe, the only means of smoking tobacco. This section examines various methods of taking tobacco other than by clay pipe, with special reference to those which were or became popular during the C19 - the century when the clay pipe declined and in England virtually died as a means of smoking; and when what in Britain at least are the two most common methods of smoking, the cigarette and the brier pipe, first appeared.

(b) SNUFF

Snuff, as previously noted, was known in the New World in pre-Columbian times. According to Penn (1901: 260) snuff "was at first almost the only mode of taking tobacco" smoking coming later, but this statement does not appear to be borne out by the available evidence.

According to A.H. Dunhill (1954: 102-3, 1961 ed), the Dutch first brught snuff to Europe in the earlier C17; and ca.1625 the French appear to have introduced it to their country from the West Indies (Dickson 1954: 92). The Dutch, with the Portuguese, appear to have spread the use of tobacco widely in Asia, and are said to have introduced it into India in 1599, to Java in 1601, and to China in 1609 (Penn 1901: 22, 36, 50; cf Laufer 1924a: 38) - according to Penn (1901: 50) the Korean word for tobacco means Dutchman - but one would have thought snuff would have reached at least Spain at the same time as the other forms of tobacco-taking. Snuff was said to be the most common method of taking tobacco in Spain before 1650 (quoted in OED vol IX s.v. smutchin, noting a source actually written in 1646 - see below), and large amounts which had been shipped from Havana for Spain were captured by the British at the battle of Vigo Bay in 1702 (see below).

According to Penn (1901: 35) it was the prevelance of snuff-taking in Italy, Spain, and Austria which caused Pope Urban VIII to threaten excommunication in 1624 to all who took tobacco into churches; in fact the interdiction was made in 1642 (Corti 1930: 128-30, 1931 ed) with specific reference to the diocese of Seville's appeal to the pope for action, and was repeated in 1650 (Corti 1930: 130-1, 1931 ed) with specific reference to St Peter's in Rome itself. On both occasions snuff is mentioned (cf Dickson 1954: 153-4, 151). Penn also notes (loc. cit.) that the growing prevalence of snuff caused Louis XIII in 1635 to prohibit for a short time the sale of tobacco save by apothocaries on the order of a doctor; but Corti (1930: 150, 1931 ed), probably more accurate, says the order was that of a police official apparently unaware that his action was cutting the revenue from Richelieu's tax on tobacco of six years previously, and that the order was soon revoked.

Dickson (1954: 178-9) maintains there is absolutely no evidence for the use of snuff as late as ca.1590 in England, but it appears to have been known there by the beginning of the C17 (Laufer 1924b: 39-40, quoting Henry

Buttes's Dyets dry diner of 1599 and Thomas Dekker's The Guls Horne-booke of 1609;[14] MacInnes 1926: pl V, showing an illustration of 1617; cf Fairholt 1859: 123, referring to a snuff-box temp. James I). (Penn (1901: 220), quoting the closing sentences of James I's Counter-blaste of 1604, makes James refer to snuff, but neither the same section quoted by Dickson (1954: 156) nor the copy of this work available to this writer (Stuart 1604) includes the sentence "(Look to it, you that take snuff in profusion!)" quoted by Penn.) According to Penn snuff appears to have been the favoured method of taking tobacco among the Puritans. Most authorities appear agreed, however, that it was not until after the Restoration in 1660, and the return of Charles II and his court with French influences, that snuff became the aristocratic way of taking tobacco in England (Corti 1930: 188, 1931 ed); and by ca.1700 snuff was becoming increasingly popular (Laufer 1924b: 40, 39; Rive 1926: 63) in a desire to imitate French manners. (Penn, however (1901: 262), followed by Laufer (1924b: 40), says that it was the Great Plague of 1665 which brought snuff into use, on account of its supposed medical virtues, and that Dutch influence coming in with William of Orange further popularized it.)

The capture of a vast amount of snuff on Spanish ships taken at Vigo Bay in 1702 increased in use in England, the snuff being sold by the sailors, who had been given 50 tons as prize money, by the waggon-load at Plymouth, Portsmouth, and Chatham for as low as 4d a lb (Fairholt 1859: 258-9; Penn 1901: 263; cf Trevelyan 1942: 315, 1946 ed). Beau Nash decreed at the beginning of the C18 that smoking was vulgar, and as the century progressed snuff supplanted smoking to a considerable extent among all social classes and with both sexes (for a discussion of this, and its effect on the pipemaking industry, see 3: I). It is recorded that at Bath during its heyday as a spa under Beau Nash ladies in the baths received from an attendant "a little floating dish like a bason, into which the lady puts a handkerchief, a snuff-box and a nosegay" (quoted in Gadd 1971: 61). In the early C18 Defoe could comment that his servant-maid took her snuff with the air of a duchess, and in his time fashionable snuffs cost from 8s to 32s a lb; the accounts of a local Somerset family indicate at least a lb of snuff was consumed there a week. Snuff mills became common in the Bristol area, occasioning in 1756 protests that grist mills should not be used for any other purpose than grinding corn (Latimer 1893: 302-3, 269, 430). In A Description of all Trades... published in 1747 it was noted that

> It is but a few years since [the snuffmakers'] trade made any figures in shops, which now appear almost everywhere, plainly showing that not only the practice of making snuff is greatly increased, but that making and selling it must be profitable (quoted in Alford 1973: 6-7),

but Campbell's The London Tradesman of the same year observed that "This Trade is abundantly profitable, but now much over-stocked" (R. Campbell 1747: 274, 1969 ed), suggesting the market had been flooded by too many people trying to cash in on the rapid rise in popularity of snuff.

According to Penn (1901: 88) the popularity of smoking only drew level again with that of snuffing in the middle of the C19, when cigars had become the socially-accepted means of taking tobacco - snuff certainly seems to have been popular well into last century (Fairholt 1859: 285; cf Mackenzie

1957: 251). This would agree with evidence from the records of the famous London tobacconists Fribourg and Treyer, which indicate that in 1820 the firm sold only a tenth the quantity of cigars and tobacco it sold snuff and that in 1845 the sale of snuff still predominated. In 1850, however, cigars and tobacco were drawing level with snuff and in 1859 the former two began to take the lead, snuff declining in use, at least among the classes Fribourg and Treyer supplied, almost dying out by the end of the century (G. Evans 1921: 13, 39). George IV (D 1830), both as Prince Regent and King, patronized Fribourg and Treyer (G. Evans 1921: 13-15), and clearly snuffing was in fashion as late as the 1830s, whatever popularity the cigar was having from the 1820s (Sub-section (e) below). The firm's first mention of cigarettes occurs in 1852 but very few were sold until 1866 when Russian cigarettes became popular (G. Evans 1921: 37). According to Morton (1935: 182), the firm maintained that what helped kill the snuff habit was the fashion for white handkerchiefs.[15]

There is other evidence (see below) that cigars were losing their popularity at least outside the upper classes from before the middle of the C19 and that this coincided with a revival of pipe-smoking. However, Fribourg and Treyer served royalty and no doubt their upper-class patrons continued to use first snuff and then cigars long after their general popularity had gone - Evans notes (p.35) that their sale of cigars increased considerably after 1850. (Indeed, until the 1960s, cigar-smoking in Britain was largely the mark of male aristocracy and by 1900 (see Sub-section (f) below) a decidedly minor way of taking tobacco.) A. Deane's suggestion (1914: 10) that snuff ceased to be fashionable with the accession of Queen Victoria - who hated tobacco in all its forms (Corti 1930: 222, 1931 ed) - may reflect the eclipse of snuffing at court after its fashionableness under George IV (see above), though there is no evidence that the queen's disapproval of tobacco had any effect on society - or even on her son, the future Edward VII, who smoked.

According to one source, snuffing was very common in the United States in the middle of the C19 (Enc. Brit. 1960 ed: vol 5, 704); but according to Heimann (1960: 117-8) snuff with its aura of British gentility went out following American independence to be replaced by chewing-tobacco, partly, Heimann suggests, as a conscious desire to be different and partly because chewing was practical to an outdoors nation.

In Ireland snuff was said before 1646 to be as popular there as was smoking in England (quoted in Penn 1901: 262; Laufer 1924b: 40; cf MacInnes 1926: 50 and OED vol IX s.v. smutchin - Mackenzie 1957: 163-4 notes that James Howell, the author of this reference, published in 1650 but written in 1646, had been in Ireland in 1639, which suggests the observation on the popularity of snuff goes back to before 1640). Snuff-taking was still general in Ireland a hundred years later, when Wesley condemned its use (Penn 1901: 262), and as late as the 1840s snuff-mills appear to have been quite common in Ireland (Freeman 1957: passim).

However, pipe-smoking was certainly known in C17 Ireland, and pipes of that period have been found there (Fitzgerald 1855: 307-8, bottom illus. facing p.304, 309-10 editor's note; Anonymous 1855; Ronayne 1903; Rynne 1964: passim). Indeed, the first two of these references note Bristol-made pipes datable to the second half of the century (see 6: VII(b)). A shipment of pipes from Bristol - persumably Bristol-made - to Ireland is noted in 1637 (Kearney 1959: 136-7) though the extremely small figure, ten score, is perhaps a mistake for ten gross. Edward Abbott, a founder-member of the Bristol pipemakers' guild in 1652, recorded in 1653 and 1654 that he had been a pipemaker in Waterford in 1641 when the Irish uprising had occurred, and that the Irish had expelled all Englishmen except for a few craftsmen with skills the Irish did not have, including Abbott's (Nott and Ralph (eds) 1947: 117-8). In 1619, when Waterford was being incorporated, an appeal was made to Bristol citizens with useful trades to settle there: there is no record of any who did, but possibly Abbott was one, either at this time or - more likely in view of the first Bristol pipemaker only appearing in 1619 - later (Nott and Ralph (eds) 1947: 4; Latimer 1900: 71). Among the charges listed against Strafford at his impeachment in 1641 was that he had instituted monopolies on a number of items exported to Ireland, including tobacco and tobacco-pipes, though in the event the latter monopoly was never discussed (Miss C.V. Wedgwood *in litt.* 20 January 1969). According to T.P. Cooper (1907: 104; also *SPD* Chas. II 16 Aug 1666) a certain Col William Legge appealed in 1666 for a grant to make and sell tobacco-pipes in Ireland "as persons had in previous years obtained Royal Letters Patent for the sole rights of retailing tobacco in various towns and districts", but the sequel is not recorded.

Tobacco was Ireland's major import from before 1660 until the early 1700s, much of it coming direct to Cork, Galway, and Belfast before the Navigation Act of 1671 and again in the period 1680-85. In 1683 and again in 1695 over 2,800,000 lb were imported. In the C18, however, the amount imported as a percentage of total Irish imports steadily dropped from 26% in 1698 to 1% and 5% in 1788 and 1798 respectively (L.M. Cullen 1968: *passim*). The C17 figures suggest that if the Irish did indeed prefer snuff to pipe-smoking that early it was hardly occasioned by a scarcity of tobacco, though tobacco was probably expensive compared to English prices and pipes may have been relatively scarce and expensive.

The popularity of snuff in Scotland may have started as early as it did in Ireland (cf MacInnes *loc. cit.*). Certainly, as is discussed in detail in 4: IV, tobacco was known, used, imported, and even grown in Scotland from the early C17. Prior to granting a monopoly in 1616 for the importation of tobacco into Scotland, James VI had first forbidden its importation, then finding this being evaded and "the country...ever universally filled with tobacco, and public and common merchandise made of the same" had imposed a tax, which, however, had only encouraged smuggling. In 1634 Charles I granted a monopoly for the selling of licences to retailers of tobacco partly in order to reduce abuses rampant from the "ungoverned sale and immoderate use of tobacco" in Scotland. This monopoly was revoked in 1641, but in 1669 Charles II granted a monopoly to tax tobacco, causing according to a contemporary historian considerable hardship, custom having made tobacco "as necessary as nature had made meat and drink" (for references see 4: IV). Unfortunately, none of these references state how tobacco was being used, nor does a reference to the fourth Earl of Montrose, who died in 1626, describing him as "a devotee of tobacco" (Mackenzie (1957: 151), who appears to be using Chambers's *Domestic Annals of Scotland*..., one of the sources cited above, talks of the 1634 monopoly as being intended to control smoking and snuffing, but Chambers mentions neither usage.) Refernces to pipe-smoking and pipe-manufacture in Scotland in the C17 are known, and C17 pipes are known from excavations (see 4: IV); but an account of Scotland by an anonymous Englishman published in 1702 certainly indicates that by the end of the C17 snuffing was very common in Scotland, more so than smoking was, the writer noting that the Scots were

> fond of tobacco, but more from the sneesh-box [snuff-box] than the pipe. And they have made it so necessary, that I have heard some of them say, that, should their bread come in competition with it, they would rather fast than their sneesh should be taken away. Yet mostly it consists of the coarsest tobacco, dried by the fire, and powdered in a little engine after the form of a tap, which they carry in their pockets, and is both a mill to grind, and a box to keep it in (quoted in Chambers 1858: II, 494).

(Mackenzie (1957: 169) notes a story, apparently prevelant about the beginning of the C18 in Germany, that Scottish soldiers of fortune killed in the Thirty Years' War, 1618-48, had been found to have soot on their brains as a result of snuffing. Corti (1930: 173-4, 1931 ed) records a more generalized version of this story, not mentioning Scots and involving smoking, not snuffing - whether smoking could or could not deposit soot on the brain was earnestly debated by doctors and others in Germany during the second half of the C17. Mackenzie's version may reflect a memory of Scots being noted snuffers before the middle of the C17, however.)

The Scots' reputation for manufacturing snuff appears to have started as early as their connections with the American tobacco trade in the earlier C18 (Heimann 1960: 65; cf a 1745 reference to "Scotch Snuff" sent to Virginia in I. Noël Hume 1969b: 39), and their reputation as snuff-takers certainly existed from long before that time and continued well into the C19 (Laufer 1924b: 41-2; cf Fairholt 1859: 274-84, cf 135; N&Q 24 July 1875: 67; Penn 1901: 262; Apperson 1914: 244-50; Mackenzie 1957: 190-2; Prebble 1968: 41; Cerveri 1970: 7; Barnett, Klein, and Thomas 1970: 27 fig 27.) The tradition of a wooden statue of a Highlander as the sign for a snuff-merchant's shop supposedly originated from a signboard - "ye Highlander, Thistle & Crown" - used in 1720 by one David Wishart, a snuff-merchant in Coventry St, London, who also used it to indicate a Jacobite rendezvous (Heal 1947: 170). The signboard illustrated by Heal shows a Highlander carrying a targe and wearing a bonnet and a short kilt-like dress, with a tobacco-roll at his feet, facing a large thistle growing out of the ground with an equally-large crown suspended above it; the same scene appears on Wishart's trade-card bearing the date 1720 illustrated by Meadows (1957: 38 fig 6), where Wishart is described as making and selling "all sorts of Snuff", including "high and low dry'd Scots Snuff". A. and C. Scott (1966: 127-9) talk of the 1720 trade-card depicting the figure wearing the trews, not the kilt later universal on the wooden figures, but the Scotts are not an accurate source, and in this case they are plainly wrong. A traveller in Scotland visiting a cattle-fair in 1723 observed that

> The Highland Gentlemen were mighty civil, dress' in their slashed short Waistcoats, a Trousing (which is Breeches and

> Stockings of one piece of striped stuff) with a Plaid for a Cloak and a blue Bonnet. They had a Ponyard, Knife and Fork in one Sheath, hanging at one side of their Belt, their Pistol at the other, and their Snuff Mill before, with a great broad Sword by their side (quoted in Grant 1961: 69).

Their "Attendants" were described as wearing "belted Plaids, girt like a Woman's Petticoats down to the Knees, their Thighs and half the Leg all bare" - in other words, the precursor of the kilt - and from these descriptions it appears that it was the Highland gentry with whom snuff was particularly associated and that the "Snuff Mill" (i.e. mull) was considered part of the accoutrements of the well-dressed Highland gentleman (for snuff mulls see Scott and Scott 1966: 122-4, illus. on p.123). This might agree with the Scotts' story of a trousered figure appearing in some early depiction, but if so it is not on Wishart's sign or card (unfortunately, the Scotts do not distinguish among their sources: they list Larwood and Hotten's The History of Signboards,... (1866), Heal's Signboards of Old London Shops (1947), and Meadows's Trade Signs and their Origins (1957) in their "Abbreviated Bibliography", but none of these refers to a figure wearing the trews).

At least among the Lowlanders, however, snuffing appears to have been a standard practice among all classes, Burt, writing in the later 1720s, commenting acidly at one point of a case some years earlier where a friend of his, moving into a house "within Half a Quarter of a Mile of Edinburgh, which was then about to be left by a Woman of Distinction" found among numerous other disgusting sights "the Walls near the Servants' Table, which had been white, almost covered with Snuff spit against it" (Burt 1754: I, 149-50, 1874 ed); later, he cited an example "of the People's Disaffection to the present Government" in a church in Aberdeen, where when the king was prayed for by name "the People all rose up as one, in Contempt of it, the Men and Women set themselves about some trivial Action, as taking Snuff, &c.," (1754: I, 223). As is discussed in more detail later (pp 348,349 n.6), Burt noted that smoking in Scotland, except at wakes, was "very rare".

It has been suggested (Scott and Scott 1966: 122) that the Scots' partiality to snuff comes from their C17 ties with France, but the "Auld Alliance" must have been very much in eclipse in the later C16 and earlier C17 following the Scottish Reformation, and it is unlikely that this is the cause of the Scottish snuff-taking habit. The C18 Scottish tobacco trade - virtually confined to Glasgow - was tied to re-export to the Continent, chiefly France (see 4: IV), and this may well have stimulated snuff - production and snuff-taking in Scotland (cf Heimann 1960: 65), but there must have been an earlier predilection for snuff in Scotland - certainly Ireland was not involved in the snuff trade, yet snuff was extremely popular there before 1650 (see above). It takes a lesser quantity of leaf to produce enough powder for snuffing than flake for smoking, and in addition the stalk as well as non-tobacco ingredients are used in snuff-manufacture (Rive 1926: 63), so that snuff would be an obvious substitute where tobacco was relatively scarce and expensive - the fact that the 1723 observer noted above could record that it was the Highland chiefs for whom a snuff mull was evidently considered de rigueur reinforces the suggestion that tobacco at that time was expensive.

Scottish ships were not allowed to trade with English colonies prior to the Union of 1707, which must have considerably restricted Scottish tobacco consumption in the C17, while all products for Ireland had to be re-exported there from England in English ships, which must have increased costs, including that of tobacco, considerably. Tobacco-smuggling was common (e.g. Rive 1929), but L.M. Cullen (1969: passim) has argued that smuggling did not play the prominent part in Irish economy that has been assigned it. Shortly before the middle of the C18 evidence suggests ca.300,000 lb of tobacco smuggled annually compared to legal imports of between three and four million lb. Only in the 1780s, and the 1790s before the outbreak of war, did tobacco-smuggling rapidly rise (L.M. Cullen 1969: 171 and n.102).

Certainly the Scots do not appear to have manufactured tobacco-pipes to any major extent prior to the C19. After the Union the Scots were able to import their own tobacco, but Ireland was not to be so favoured for nearly another century and had to rely on illegally imported shipments or additionally expensive ones reshipped from England, especially through Bristol. Thus when tobacco shipments lessened during the wars at the end of the C18 and the beginning of the C19 the amount of tobacco consumed in Ireland went down much more drastically than it did in England (Clapham 1926: 246, 1939 ed). However, if tobacco could be brought to Ireland, pipes could also - indeed, as noted above, Bristol pipes are known to have been shipped there and some have been found - so that the preference for snuff may have been to some degree a national trait, reinforced by the relatively high cost of tobacco and pipes. Scotland's preference may have had a similar origin.

In Dundee in the later 1920s snuff, which was used especially by the women workers in the city's jute mills, cost 8d an oz; in 1969 it was costing 6s8d an oz but one newsagent-tobacconist was still selling 8-9 lb a month, two-thirds of what he sold more than 40 years previously (D. Phillips 1970: 440-1). Even today, in both Scotland and England, the use of snuff by two widely divergent social groups, an upper class and an older segment of the working class, continues: at least one Bath tobacconist has a wide range of scented snuffs for the former while this writer has seen the latter using snuff in public houses in Bath.

(The manufacture of snuff is described in A.H. Dunhill 1954: 102-15, 1961 ed; also in Anonymous n.d.[22]: last two pages. For a description of earlier snuffs see G. Evans 1921: passim.)

(c) CHEWING-TOBACCO

This habit, like all other forms of taking tobacco, originated in the New World. It never appears to have been an important means of taking tobacco except in the United States from the middle of last century (Enc. Brit. 1960 ed: vol 5, 705; Nichol 1966: 100) when it was the most common method used, to the general disgust of European visitors such as Charles Dickens who commented on the state of the Senate carpets covered in tobacco-juice. The comments of L.B. Coles, a Massachusetts doctor with a pathological hatred of tobacco writing in the mid-C19 (see also below, p.59), suggest that at that time chewing was by far the commonest method of taking tobacco in the United States, other forms of consumption hardly being mentioned (L.B. Coles 1851: passim). Chewing remained the most common method of taking tobacco in the United States until the end of WW I, when it fell rapidly in popularity to below the lb-per-capita levels for cigars and smoking- (primarily pipe-) tobacco and was completely overshadowed by the astronomic rise of cigarettes (Heimann 1960: graph on pp244-5). Chewing-tobacco production reached its zenith in 1897, when 200 million lb were consumed, and fluctuated below and up to that level until 1918 and the rapid drop in popularity of chewing-tobacco (Heimann 1960: graph on pp178-9). Tobacco-tags - small tin tags pushed into each plug as advertisements - first appeared ca.1870 and continued in use until ca.1937 (M. Williams 1973: 28, 29; Heimann 1960: 136, 137).

There are periodic references to chewing tobacco in the later C17 and the C18 in England (Laufer 1924b: 44, 45-6). Fairholt (1859: 123) reproduces a scene from a snuff-box dating from the time of James I which shows a cavalier in a rather affectd attitude spitting into a bowl, and goes on to say that General Monck sanctioned the custom at the time of the Restoration, 1660, and that it was usual for gentlemen to sport silver basins as spitoons. Penn (1901: 77) repeats these stories, and Apperson (1914: 77; cf Mackie 1964: 231, 1969 ed) mentions that Monck was said to have "indulged in the unpleasant habit...and to have been imitated by others; but the practice can never have been common." Laufer (1924b: 45) doubts the stories. The chewing of tobacco appears to have been known among the poor in England last century, for in 1865 a defender of the "pew system" in the Church of England whereby seats were subscribed for, leaving few or none available for the poor of the parish, talked of defending worshippers from "those whose habits are wanting in the ordinary decencies of life" and who indulged in "an odious American habit, which is really distressing to people of delicacy, or even of common decorum" (quoted in Inglis 1963: 51) - the observer cannot bring himself to say what the odious habit was, but it was almost certainly chewing tobacco; according to A. and C. Scott (1966: 143), triangular wooden spitoons filled with sawdust were part of the furnishing of pews in at least one Essex church as late as 1861. Again according to the Scotts (loc. cit.), spitoons were being made until the 1890s. In the early C20 chewing tobacco was thought by people in Great Yarmouth to be characteristic of the Scottish fishermen who came south to the East Anglian fishing-ports with their womenfolk to take part in the herring season - one Yarmouth herring-curer, born in 1906, recalled being told as a boy

> never to walk down King Street because the men [Scottish fishermen] used to stand there in groups. They were quite polite; but they just used to spit. You could get spat on four or five times in five minutes! They really didn't mean any harm: only it was just this quid tobacco (recounted in G.E. Evans 1975: 202).

In the C18 signs were known showing figures such as a Dutchman, a Scotsman, and a sailor, with the legend "I smokes, I snuffs, I chaws" or some elaboration of this (e.g. Fairholt 1859: 134-5; Laufer 1924b: 46): this indicates that the tradition of sailors chewing tobacco is long established and probably goes back to the earliest contacts with the New World. In addition, the forbidding of smoking on board ship because of fire risk and the breakability of pipes in any case no doubt encouraged chewing (cf MacInnes 1926: 49-50; Heimann 1960: 62). However, one variant on the "I smokes, I snuffs, I chaws" theme noted on an C18 tobacconist's card, while attributing smoking to (apparently) a Dutchman, attributes snuffing to a Frenchman and chewing to a Scot (Heal 1925: 60); while a tobacco label and a tobacconist's sign depicting the same motif attribute chewing to an Englishman (label described in Mackenzie 1957: 184; sign illustrated in Meadows 1957: 39 fig 3). The associations of snuffing with a Frenchman and smoking with a Dutchman are acceptable enough, but there is no other evidence to suggest that chewing tobacco was distinctive to either the Scots or the English, and it is probable that these latter depictions are a corruption of the original theme. Yet another version of this trinity, and one which probably identifies correctly the individual chewing the tobacco, is what Larwood and Hotten refer to as the "lares and penates of the tobacconist", the depictions of a Scot, a sailor, and a moor or Oriental representing respectively snuffing, chewing, and smoking (Larwood and Hotten 1866: 421). What may be the origin of the tripartite legends occurs in a depiction dated as early as 1617 of a London tobacconist's shop (MacInnes 1926: pl V) which is the title-page of Richard Brathwait's The Smoaking Age and shows three fashionably-dressed gentlemen seated and smoking, with various Latin tags and puns attached to them, and called respectively Captains Whiffe, Pipe, and Snuffe. From such a depiction it would be a short step to showing Captain Snuffe snuffing rather than smoking and thence to change one of the others to effect the third method of tobacco-taking. However, chewing tobacco has always remained rare in Britain.

(d) MEERSCHAUM PIPES

The earliest rival of the clay pipe was the meerschaum pipe. The origin of the use of this material in pipemaking is obscure, and the traditional story about this event appears to be fictitious. This story tells that ca.1720 a shoemaker in Budapest called Karl Kovács who made carvings and wooden pipes in his spare time was asked by a Count Andrassy to carve a pipe from a piece of meerschaum which the count had obtained from Turkey. Kovács did so, making in fact two and keeping one for himself, which he discovered became golden-brown where the cobbler's wax on his fingers had been absorbed by the meerschaum (variants of this story in Penn 1901: 152; A. Dunhill 1924: 234-5; and Weber 1962: 23-4 - the shoemaker's name appears in various forms, e.g. Karol Kowates). Penn and (possibly following him) Weber claim that the original meerschaum pipe was preserved - Penn says in the Pesth (Pest) Museum, Weber in the National Museum of Hungary, Budapest - but this is denied by the latter, which also notes that the Turks had introduced these pipes by the C17 (Magyar Nemzeti Múzeum [National Museum of Hungary] in litt. 11 December 1967). It should be noted that this story does not appear in Fairholt, and Fairholt was probably the most diligent and critical writer on his subject in the C19 - this may indicate the story is a late invention.

Hendrickx (1963: 159-60) dismisses the Kovács story, and also one about a Hungarian Andrassy who found the raw material when digging (this tale is not known to this writer but sounds like a garbled version of the Count Andrassy involvement in the Kovács story) but notes a bizarre account (perhaps quoting from Adolphe Bitard's Les arts et métiers illustrés of ca.1885, vol I (pp365-6) where it occurs) involving the origin of the name Meerschaum. This story, claimed according to Hendrickx by some etymologists, is that a Frenchman, Kummer, first made pipes of the material and that from this the French term for the material, *écume de mer* (literally, "sea-foam", for which *Meerschaum* is the German translation) was derived. Herment (1952: 42, 1965 ed) notes this explanation is still current, but correctly observes it is erroneous. In fact, as stated above, the term *écume de mer* is a translation of the German *Meerschaum*, and that term in turn is a translation of the Persian *kef-i-darya*, sea-foam (so *OED*). Bastien (1973: 2nd chapt) cites, though he does not give the title of, a work "*consacrée aux pipes en écume*" by a Eugène Vivier, "*instrumentiste réputé du siècle dernier, humoriste, fin lettré, grand fumeur de pipe*", which asserted that while Kummer had indeed made pipes of "*une certaine matière*" it had been erroneously supposed that he had used a play of words on his name to make it appear his pipes were of meerschaum. Unfortunately, who Kummer was, where he worked, and what the "certain material" was with which he made pipes is not stated. The only hint to the last point is that it was a less valuable material than meerschaum; one suspects it may simply have been superior-quality clay.

Yet another story, told this writer during his visit to the pipe-collection of Douwe Egberts, the Utrecht tobacco, tea, and coffee firm, in April 1969, is that on their retreat from the siege of Vienna in 1683 the Turks left behind in their camp quantities of meerschaum which were used to start a meerschaum pipe industry in Vienna. In this version, the story seems improbable but it does involve a date more in keeping with the evidence of the National Museum of Hungary; however, Savary des Bruslons in the 1759-65 edition of his *Dictionnaire universel*..., where the entry on pipes at any rate is still probably basically early C18 in date, describes the Turks as smoking pipes with three- or four-ft long wooden or reed stems and an earthenware bowl (Savary des Bruslons 1759-65 ed: IV, col. 200), and makes no mention of meerschaum (the same description of Turkish pipes occurs in the *Dictionnaire domestique portatif*,... (Roux *et al* 1762-64: II, 357), where the entry is almost wholly a slightly shortened version of Savary des Bruslons's account[16]). Bastien (1973: 2nd chapt), who is a very unreliable source (cf pp243-4), claims the meerschaum pipe originated in Austria in the C18.

According to Hendrickx (1963: 160) one Cristoffel Dreisz from Ruhla succeeded in 1770 in using the meerschaum chips left over from carving meerschaum pipes to produce imitation meerschaum pipes. (Hendrickx is not using Bitard here, for that work (n.d.: I, 368), citing "Beckmann" as his source - a work this writer has been unable to trace - indicated it was ca.1750 that the process was invented, at Ruhla, though not ascribed to any particular person.)

As meerschaum could be beautifully carved and coloured, pipes made from this material naturally became a socially-respectable means of smoking; the use of amber stems enhanced their appearance and also their price. However, while they may have begun to displace the long Alderman clay pipes which by the end of the C18 were the mark of a gentleman - as opposed to the short-stemmed cutties used by the lower classes (e.g. Fresco-Corbu 1964: 1286, fig 2) - it is difficult to believe that these aristocratic pipes caused any major drop in the production of clay pipes. According to one source (Anonymous 1856a: 94) meerschaum pipes first appeared in Britain at the end of the Napoleonic Wars, as did porcelain and "carved" (elaborately moulded clay?) pipes, "in the hands and moustached mouths of the allies who came over here in 1814, and who made them familiar with the populace by their daily and nightly exhibition in the streets of London". The same observer notes that by 1856 the meerschaum was on the decline, the cutty having become all the rage both at home and abroad (*loc. cit.*).

The London pipe firm of Inderwick, founded in 1797, claim they introduced the meerschaum pipe into Britain ca.1799, and say that with the brier pipe appearing ca.1870 the meerschaum declined in popularity (Inderwick and Co Ltd *in litt.* 24 February 1969). According to Weber (1962: 24), meerschaums became less expensive during the second half of the C19, and Austria turned out great numbers; another source (*Enc. Brit.* 9th ed 1875-89: XIX, 111-2) says Ruhla in Thuringia was the centre of the meerschaum industry, turning out annually in the 1870s 540,000 genuine and 5,400,000 artificial meerschaums (cf Hendrickx's remark above). Bitard, writing ca. 1885 (n.d.: I, 368) noted that the chief centres for producing artificial meerschaums were Ruhla, Nuremberg (Nürnberg) in Bavaria, and Lemgo in Westphalia. Bitard claimed that until 1850, when the first French factory opened in Paris, Austria had a monopoly on genuine meerschaums.

A meerschaum effigy bowl, described as having "what appeared to be the head of Zeus adorning it", has been found on the site of the chief factor's house during recent excavations at Fort Pelly I, Saskatchewan, Canada, a Hudson's Bay Company trading-post occupied 1824-56 (Christensen 1973: 59); meerschaum pipes appear in the Hudson's Bay Company list of goods for its North American trading-posts in 1862 when they were supplied by a Ciphraim Levin (Krause 1969-70), probably of London. The San Francisco paper the *Daily Alta California* carried an advertisement in its 1 July and subsequent issues for "Warranted Genuine Meerschaum Pipes, the largest Stock in California for sale low by Adolph Sutro & Co., 116 Montgomery St. Bet. w Sac. & California, San Francisco." (I owe this reference to my former colleague, J.P. Wilson, *in litt.* 12 December 1975).

According to Fresco-Corbu (1960: 1101), the much less fragile brier pipe began to displace the meerschaum from the 1860s onwards and by WW I meerschaum pipes had largely died out. In 1954, however, meerschaum deposits were located in Tanganyika (Tanzania), and from 1956, when production was 1,000 pipes, production had risen to over 100,000 annually by the end of the 1960s (Graves 1969: 71-2).

(e) CIGARS

The cigar was also used in the New World before the arrival of Europeans. Because it was the method of smoking tobacco in the areas settled by the Spaniards it was they who introduced the habit into Europe in the first half of the C16. Indeed pipe-smoking in Spain must have been extremely rare to judge by there being only 100 gross pipes exported from London to Spain between Michaelmas and Christmas 1698 compared to 41,000 gross to France, itself not a major consumer, for the same period (Oswald 1960a: 48, London is the port meant, cf Oswald 1959a: 59-60; cf Fairholt 1859: 217 and Laufer 1924b: 47). Despite some implied and occasionally explicit references to cigars in England prior to 1600 (see Section V above, also West (ed) 1953: 63), some evidence that they were (probably very occasionally) known in the C18 in England (West (ed) *loc. cit.*), and a reference to their being sold in

The Netherlands in 1667 (Brongers 1964b: 218-19), cigars do not appear to have spread beyond Spain to any extent for over two centuries, and when they did it appears to have been through American sailors, who brought them to Rome where they were being made from 1779 (Ortiz 1940: 243, 1947 ed), and Hamburg. Cigars were being manufactured in a small way at Hamburg from ca.1788, spreading their use in Germany (Fairholt 1859: 219; Laufer 1924b: 46; Enc. Brit. 1966 ed: vol 5, 767). Cigars were appearing in The Netherlands at the end of the C18 and became popular during the first half of the C19; an 1809 reference describes cigar-smoking as a Latin American custom, suggesting the Dutch may have adopted the habit from there rather than North America or the early European centres noted above. The first Dutch cigar-factory was opened in 1826 (Brongers 1964b: 219-20; also in Anonymous 1951: 113).

In the English American colonies, Connecticut and Massachusetts passed legislation in the first half of the C17 forbidding the consumption of tobacco grown in other colonies, which led to relatively coarse local tobacco being used. It also produced the cigar early in Connecticut as Indians there, in addition to smoking pipes, made crude cigars (Heimann 1960: 80). In 1762 General Israel Putnam, later to fight the British at Bunker Hill, returned to Connecticut after serving with the British forces which had captured Cuba, bringing with him three donkey-loads of Havana cigars, and this appears to have revived or increased local consumption of cigars and the manufacture of cigars from local leaf (Heimann 1960: 86-7). (The Enc. Brit. 1960 ed: vol 5, 702-3 is possibly referring to this when it says that cigars appeared in the later 1700s as a result of Spanish influence, though it claims they were made from West Indies tobacco and not from American-grown tobacco.) Cigars were being used by the Pennsylvania Deutsch by 1785 and the name stogy, first recorded in the 1890s for cigars (OED vol X, 1000 and DAE vols I, 586 and IV, 2240) but doubtless in use long before that, derives from the Connestoga waggon used in Pennsylvania from the second half of the C18 as a customary means of transport (Enc. Brit. 1960 ed: vol 5, 703; Heimann 1960: 87). The expensive Beaver Club - founded in 1785 by employees of the Hudson's Bay Company who had wintered in Canada's north-west Arctic - held fortnightly winter meetings in Montreal, and cigars are noted in the bill which has survived for one such party in September 1808 (MacKay 1936: 118-9, 1966 ed).

The popularity of the cigar in the United States appears to have risen throughout the C19 - the Enc. Brit. 1966 ed: vol 5, 766 says that only after the American Civil War, 1861-65, did cigars become cheap enough for widespread use; but Heimann believes the change was simply one of taste. There was the Spanish influence in the south and west; there was also the New England, specifically Boston, relative sophistication which made the cigar socially respectable and an advance on chewing-tobacco. Cultured surroundings became less and less suitable for chewing and spitting, though it was not until the end of WW I that chewing lost its place as the most common method of taking tobacco in the United States to the cigar. Within a few years both were to be completely outstripped by the cigarette. However, an 1876 cartoon showing various people representing their countries and taking tobacco in the manner alleged to be characteristic of their country shows Uncle Sam with a cigar (and Queen Victoria (!) with a cigarette), indicating that by the time the American image was being changed (Heimann 1960: 4th chapt and chart on pp224-5). According to Lewine (1970: 12-13, 14) cigars in the United States first became common after the War of 1812 and in the 1820s in New England, when ca.20 million cigars were being produced. The Mexican war of 1848 popularized cigars and cigarillos but it was not until the Civil War in the 1860s that the nation became cigar-conscious, helped particularly by General Grant. By 1880 ca.2,400,000,000 cigars were being sold annually. Maximum cigar-consumption in the United States - 86 per capita - was reached in 1907 (Heimann 1960: 216, 217), a level two-and-a-half times the current figure (see p.61 below). The Hudson's Bay Company records of goods shipped annually to its North American trading-posts suggest that in Canada too cigars became popular only in the second half of the C19, for they do not appear to mention cigars before 1847, and cheroots do not appear before 1858 (Krause 1969-70: passim).

It is generally held (e.g. Anonymous n.d.[1]: 6th page; A. Deane 1914: 9; Laufer 1924b: 46-7) that cigars were first introduced into Britain and France by veterans of the Penninsular War, 1807-14, against Napoleon. However, the records of Fribourg and Treyer referred to earlier first mention cigars - as "Segars" or "Havannah Segars" - before 1800 (G. Evans 1921: 34-5), which suggests Cuban, or at least allegedly Cuban, imports were known in Britain before the Peninsular War. Cheroots occur in an entry of 1801 (G. Evans 1921: 25). (Mackenzie (1957: 204) cites Evans, but slightly inaccurately; elsewhere (see 5: I) he also misquotes Evans.) According to Laufer (1924b: 47) the importation of cigars was at first prohibited, but with the end of the Napoleonic Wars in 1815 cigars were admitted at a duty of 18s a lb (cf Fairholt 1859: 219). In 1823, the year Byron wrote some verse eulogizing the cigar (Laufer 1924b: 47), only 26 lb of manufactured cigars were imported, but a reduction in duty resulted in 15,380 lb being imported in 1824. In 1825 the amount was down to 9,569 lb but thereafter it steadily increased so that in 1830 the amount imported was 253,882 lb (Fairholt 1859: 220). According to Fairholt (loc. cit.) duty was reduced to 9s a lb in 1830; Corti (1930: 222, 1931 ed) gives the date as 1829.

(The cheroot is a Far Eastern adaptation of the cigar, and is known as early as the second half of the C17 (OED vol II,323); Prebble (1968: 313) notes "cigars" on board a ship anchored off Edinburgh in 1704 which had just returned from the Ganges delta. The cheroot differs from the cigar in that it is always cut flat at both ends, and is nowadays made by mechanically rolling tobacco on to a wire (Fairholt 1859: 218; Penn 1901: 189; A.H. Dunhill 1954: 149, 1961 ed). The manufacture of cigars is described in A.H. Dunhill 1954: 98-101, 1961 ed; also in Anonymous n.d.[19] and n.d.[23]. An interesting detailed account of cigar-manufacture in Lincolnshire ca.1900 is given in N.R. Wright 1970: 2-5.)

Unfortunately, as is discussed in more detail in Section VIII immediately following, there is some confusion as regards evidence for tobacco-consumption at this period. However, there seems a consensus among the authorities that consumption in England did decline in the 1810s but was recovering before 1830; certainly, an 1831 source quoted by Laufer (1924b: 47) notes that "the taste for smoking has revived...but instead of the sober sedentary pipe, the ambulatory cigar is chiefly used". As this quotation indicates, cigars had become common by 1831, but they must have been rapidly gaining in popularity even before 1825, for two cartoons of that date (illustrated in Corti 1930: figs 59 and 61, 1931 ed) suggest cigar-smoking was all the rage among all social classes. Certainly Dickens in *The Pickwick Papers*, published in 1836, indicates that cigar-smoking was very far from being confined to the respectable classes (e.g. in Mackenzie 1957: 233). A French cartoon, displayed in the Musée du Tabac, Bergerac, and very similar to those illustrated by Corti, shows not only men and children smoking but women as well; it is dated 1842 which perhaps suggests that the popularity of cigars came a little later in France than in England. According to Lotte (1963: 38) the French *Régie* (state monopoly) did not begin to produce cigars until 1832. Manuscript records of the Gouda pipemakers' guild in The Netherlands unearthed by this writer record in 1826 that cigars had been "in general use for a long time", and an 1809 reference (Brongers 1964b: 220) indicates they were becoming popular by that date, showing they had become common there earlier than in Britain. With the popularity of cigars came the popularity, at least with the upper classes, of meerschaum and amber cigar-holders.

However, as has been noted earlier when dealing with the early spread of pipe-smoking, and as will be noted when dealing with cigarettes, contemporary comments on the prevalence of a new social phenomenon can be extremely misleading, and it is not necessary to suppose that these cartoons imply chain cigar-smoking on a national scale at the dates indicated. Further, smoking of any sort in public, whether indoors or in the open, was taboo in respectable society in Britain until well towards the end of the C19 (Penn 1901: *passim*, e.g. pp86-97; Apperson 1914; chapts IX-XII *passim*, e.g. pp153, 161-2; Scott and Scott 1966: 139-40; cf the Dickens characters Tupman and Snodgrass smoking in a public-house but not in the street, quoted in Mackenzie 1957: 233). According to the Scotts (1966: 139), smoking was not permitted in London clubs until White's, "bowing to the demands of the younger members", gave way in 1845. Although smoking does not appear to have been completely prohibited in the earliest days of railway travel, it was not until 1846 that the first smoking-saloon was introduced - by the Eastern Counties Railway - and only in 1868 that the provision of smoking-carriages on all trains was made compulsory (C.E. Lee 1946: 35-6).[17] Because of this ostracism of smoking, Cigar Divans - places where a gentleman could go to smoke in socially-acceptable surroundings - had been established by 1830: in 1837, when Victoria became queen, there were about a dozen Cigar Divans in London, and at least one was still in existence when she died in 1901 (Scott and Scott *loc. cit.*). (One source (West (ed) 1953: 33) claims that the term "dive" for a place of low repute is a contraction of "divan" used in this sense; the *OED*, however, does not mention this, merely noting this use of dive to be American and to first appear in print in 1882, with the implication that their being of "low" repute and frequently in cellars and the like is the origin of the term.) The earlier editions of *A Dictionary of Arts, Manufactures, and Mines*... by Andrew Ure, a renowned chemist and medical doctor, fell so far from the impartiality presumably striven for by such magisterial compendia as to introduce the section on tobacco-pipe manufacture in the following terms:

> Some seek in the inhalation of tobacco-smoke a pleasurable narcotism; others imagine it to be beneficial to their health; but, in general, smoking is merely a dreamy resource against ennui, which ere long becomes an indispensable stimulus. The filthiness of the habit, this offensive odour which persons under its influence emit from their mouths and clothes, the stupor it too often occasions, as well as the sallow complexion, black or carious teeth, and impaired digestion, all prove the great consumption of tobacco to be akin in evil influence upon mankind to the use of ardent spirits (Ure 1848 ed: 1262 - this was the third edition of the encyclopaedia, the first edition of which appeared in 1839; the fifth, which appeared in 1860 and was edited by a Robert Hunt, had these comments removed from the relevant section in vol III, 909-11).[18]

Smoking was among the many amusements frowned upon by evangelicals in Victorian times. Sir James Stephen (1789-1859), an evangelical Churchman (and grandfather of Virginia Woolf[19]), is recorded by his son Sir Leslie Stephen as having "once smoked a cigar, and found it so delicious that he never smoked again" (quoted in Inglis 1963: 76). Although a biblical defence of at any rate cigarette smoking has been noted by Matrix (cited in Gardner 1975: 180) in Genesis xxiv, 64 (Authorized Version translation), the Salvation Army believed that smoking, like drinking, encouraged indulgence, and smoking was frequently mentioned by converts in accounts of their Godless lives before conversion. Salvation Army leaders were profoundly shocked when the famous Baptist preacher, Charles Spurgeon, arrived at one of his meetings smoking a cigar and declaring that he smoked to the honour and glory of God (Inglis 1963: 185); and Thomas Cook, who founded Cooks the travel agency and was himself a Baptist lay-preacher, denounced "the use of tobacco, snuff, cigars and opium, with all other intoxicating agents - solid, liquid, or fluid [gaseous?]" in his *The Anti-Smoker and Progressive Temperance Reformer*, a monthly which he founded and produced between May 1842 and December 1843 (Pudney 1953: 65). L.B. Coles, a Massachusetts doctor writing in the mid-C19 in typical mid-C19 prose, fulminated at extended length about indulgence in tobacco, claiming amongst other religious observations that "tobacco and the Holy Ghost can no more dwell in the same person, than the Holy Ghost and alcohol" (L.B. Coles 1851: 99); and repeatedly maintained it was even worse, because of the insidiousness of its effects, than alcohol. Dire medical stories and impassioned religious appeals abound, and other stimulants lumped together with tobacco and alcohol and condemned are pepper, mustard, tea, and coffee (1851: 38).

One source in 1838 (a newspaper quoted in Hermessen 1926: 326) says that by that time, only seven years after a reference to smoking having revived in the form of cigars (see above), there was in England a swing away from the novelty of cigars, and that the short clay pipe was now fashionable. Cook, in an account in 1843 of his converting two probably illegal smokers in a railway carriage (smoking on trains at that time being largely forbidden - as noted above, the first railway-line to introduce smoking-carriages did so only in 1846), notes that one smoked a cigar and had a snuff box and the other smoked "a short black pipe" (Pudney 1953: 66). In 1852 another writer (Lamb 1852: 31) noted that "At the present time use of Clay Pipes is very general among the better class of smoker, and on this account the finish of Pipes is more attended to". The popularity of the short clay pipe is also noted in 1856 (Anonymous 1856a: 94) when the use of cutties is called a mania, though the context here is the decline in the use of meerschaum pipes. Mayhew, the observer of the London poor, noted that by about the middle of the century the street cigar-vendors, common during the previous 20 and more years, had largely disappeared (1861-62: I, 441; 1968 ed).

According to Fairholt (1859: 220; cf Apperson 1914: 166), at his time more than half the tobacco smoked in the large towns was in the form of cigars; and G. Evans (1921: 35) notes cigar sales at the exclusive tobacconists Fribourg and Treyer increase considerably after 1850. Fresco-Corbu (1960: 1100) unfortunately misquotes Fairholt - without mentioning his source - saying that half the tobacco consumed in the country as a whole was in the form of cigars. This is misleading, for though Fairholt refers to a steady increase in the popularity of cigars from the 1820s, the remark implies clay pipe smoking still continued or had revived outside the larger towns, for the alternative to the cigar there could not have been the cigarette or brier pipe (Sub-sections (f) and (h) below) this early. This interpretation is reinforced by Mayhew's observation noted above, for the street cigar-sellers would not have been likely to have sold to the fashionable classes: the latter would buy their cigars at suitably expensive stores, and those who would have bought from street vendors would have been the lower classes. Thus the decline in cigar sales by those vendors is likely to have represented a decline in cigar-smoking among the lower classes, who presumably returned to using clay pipes.

Unfortunately, it is not until 1931 that there is a full breakdown of figures for tobacco-consumption in Britain. In 1928, which is the earliest year for which cigar sale figures are available, only 1.4 million lb of tobacco were cigars, out of a total for the year of 152.7 million lb (Todd (ed) 1957: table 1.1, 1966 ed). One source (Enc. Brit. 1966 ed: vol 5, 769) says that in 1900 four-fifths of the tobacco consumed (by weight presumably) was pipe-tobacco, and one-eighth cigarettes. Another source (A.H. Dunhill 1954: 22, 1961 ed) says that by 1908 one-eighth of the tobacco smoked in Britain was in the form of cigarettes, the remainder being taken in the form of pipe-tobacco or cigars. Neither of these works can be cited without some reservations, and the origins for these figures are not given. The one-eighth figure for cigarettes in 1900 (though not 1908) agrees with that given by the Tobacco Research Council (Todd (ed) 1957: table 2, 1966 ed) but no figures specifically for pipe-tobacco are available before 1931, consumption being divided before that date into "cigarettes", "tobacco", "cigars", and "snuff". Before 1920 consumption was divided only into "cigarettes" and "tobacco, cigars and snuff", the figures for 1900 being respectively 11.3 and 80.4 million lb. The Encyclopaedia Britannica figures indicate 80% of tobacco consumed by 1900 was pipe-tobacco and 12% cigarette, which leaves only 8% for cigars, snuff, and chewing-tobacco. If these figures are accurate they indicate a dramatic decline in the popularity of cigars during the second half of the C19. Certainly, a government committee could remark in the 1920s that "a generation has in fact grown up which, taken as a whole, regards cigars as a very occasional smoke" (quoted in Alford 1973: 364, citing R. Stone The Measurement of Consumers' Expenditure and Behaviour in the United Kingdom 1920-1930, 1954). However, a man born in Suffolk in 1888 recalled that early this century "You could get a sure-shot cigar for tuppence"; sometimes, he noted, a cigar was stuck in the band of the straight-brimmed bowler-hat that was part of the ordinary worker's Sunday dress, along with the peacock's feather that was always in the band, though more often a clay pipe was used instead (G.E. Evans 1960: 81-2, 1967 ed). Another Suffolk man, born in 1890, recalled cigars being a penny each (and tobacco 3d an ounce) and had a photograph of the staff of the Bell Hotel at Saxmundham taken at the beginning of this century in which six of the seven men - including the button-boy, who was probably only in his early teens - are shown with cigars (G.E. Evans 1975: 131, pl 12). The photograph shows the staff in the studied nonchalance common in photographs of the time, and no doubt those photographed were posed at their best and the cigars may have been part of the pose, but nevertheless it seems clear that as late as the beginning of the C20 there were still cheap cigars and these were smoked by the working classes. Taking the Tobacco Research Council's figures for 1928 noted above, cigars accounted for less than 1% of the weight of tobacco consumed, which indicates that by that time cigars had indeed gone completely out of popular favour (cf Corti 1930: 265 n.1, 1931 ed), and the Encyclopaedia Britannica figures may thus be fairly accurate.[20]

In recent years cigars have regained popularity in Britain. The Tobacco Research Council's figures (Todd (ed) 1957: table 1, 1966 ed) indicate that after a very slow decline from 1.4 million lb of cigars sold in 1928 (the first year for which figures specifically for cigars are available) to 0.9-0.8 million lb in the earlier 1950s, the figure rose from 0.9 million lb in 1955 to 1.6 million in 1960 to 2.9 million in 1965, a rise which parallels the astronomic rise in filter-tipped cigarettes from the mid-1950s and like the latter is attributable to the belief that cigarettes more than other forms of tobacco, cause lung-cancer. One source (Anonymous 1973b: 7) puts current British consumption at 25 cigars per capita as compared to figures of 35 for the United States, 49 in Germany, 93 in The Netherlands, and 202 in Denmark, which last figure is at least partly explained by the fact that Danish women have traditionally smoked cigars.

One point worth noting, a propos of cigar-consumption in Britain in the C19, is that the firm of Wills, which had been founded in 1786 and had entered the cigarette business relatively soon after that form of smoking became popular, and were indeed to dominate it - thanks particularly to their Wild Woodbine brand and their exclusive use of the Bonsack cigarette-making machine (see sub-section immediately below) - until the later 1920s, did not make cigars until 1882. This was due to lack of profit in cigar-manufacture, for cigars were hand-made and the business in Britain run by small manufacturers, and a high proportion of the cigars consumed in Britain were imported - even at the end of the C19 over 50% were imported. Instead, Wills bought domestic or imported products and distributed them wholesale, those imported initially coming from Havana though in the 1870s American-made cigars mainly from New York began to be imported by the firm

(Alford 1973: 113, 131). (For points not specifically referenced see A. Deane 1914: 9; Laufer 1924b: 46-7; Corti 1930: 220-2, 1931 ed; Fresco-Corbu 1960: 1100; Enc. Brit. 1966 ed: vol 5, 766-7).

(f) CIGARETTES

The cigarette, in the sense of tobacco wrapped in paper or a similar substance, was likewise known in the New World in pre-Columbian times, and this idea too spread to Spain. According to Mackenzie (1957: 264), the smoking of papeletes - tobacco wrapped in paper - was sufficiently widespread in Spain by 1635 to be the subject of a clerical denunciation, and Mackenzie suggests the use of paper as a wrapper may have originated from the manufacture of a particularly fine paper in Barcelona and Valencia. According to another source (Heimann 1960: 203-4, used by the Enc. Brit. 1966 ed: vol 5, 767 and probably also Lewine 1970: 11), the wrapping of cigar-fragments in paper to make poor man's cigarettes called papaletes (note spelling difference) was known from the C17 in Seville but it was the end of the C18 before paper-wrapped tobacco became respectable; yet another source (Corti 1930: 252, 1931 ed), however, states the custom came from South America, especially Brazil, where the invention was known as a papelito, in the mid-C18 and at once became fashionable. Casanova was one of the earliest foreigners to record the smoking of cigarettes (known then as cigaritos) in Spain in his Memoirs of the Spanish Years (1768-69), and a Goya painting in 1777-78 shows a cigarette (Corti loc. cit.; Anonymous 1960: 86; Brongers 1964b: 228).

Cigarettes, like cigars, spread from Spain following the Napoleonic Wars. According to Mackenzie (1957: 265), Spanish supporting forces in Denmark in 1808 tore pieces of white paper from pocket-books and wrapped tobacco in it. The word is French, but the early history of the cigarette is confused. It is possible that after the Peninsular War, tobacco rolled in paper and called a papelito (cf above) was known in Britain, but if so it was very short-lived (Apperson 1914: 180-1; cf Mackenzie reference above to Denmark). Corti (loc. cit.) notes cigarettes were being smoked in France by 1844. Penn (1901: 202), Mackenzie (1957: 265 quoting W.W. Young's The Story of the Cigarette (1916)), and Heimann (1960: 204) say the French Régie began their manufacture in 1843; Lotte (1963: 60) says 1842. Another source (Anonymous n.d.[2]: 4th page) - of uncertain accuracy - says cigarettes were being smoked in France ca.1833. There are several references to cigarettes in France and Italy in the 1840s - 1842, 1843, 1846 - but these references indicate that cigarettes were not then familiar to Englishmen (Apperson 1914: 179, 217-8). Their main spread appears to have been eastwards along the Mediterranean from Iberia (cf Corti loc. cit.), reaching Italy and the Levant and from the latter being introduced to Russia by traders. They were also appearing in the Spanish-influenced SW United States in the C19 (Heimann 1960: 203).

If some of the stories particularizing the invention of the meerschaum and brier pipes (Sub-sections (d) and (h) above and below) are highly dubious, that particularizing the invention of the cigarette is wildly improbable; but its date and setting, as with those of the other stories, reflects something of the origin of the cigarette, in this case the eastern Mediterranean background referred to above. In 1832, the story goes, the

Egyptians were besieging the Turks in Acre, and an Egyptian gunner improved his rate of fire by rolling his powder in tubes. As a reward his commander sent the crew a gift of tobacco, and as a Turkish ball had smashed the only available pipe, the crew wrapped the tobacco in powder-paper (Humphrey 1968: 6, quoting Sold American (1954); the same story appears in Lewine 1970: 11).

The credit for the introduction of the cigarette into England has been given variously to Laurence Oliphant, man of letters and of fashion, apparently in the 1860s (so Apperson 1914: 180, 181); or to one Robert Peacock Gloag, a Scot who had been paymaster with the Turkish troops in the Crimean War, 1854-56, and who set up a factory at Walworth in south London in 1856 or 1857 (e.g. C. Brookes 1969; West (ed) 1953: 35; cf Mackenzie 1957: 266). Like the stories about the different people supposed to have introduced pipe-smoking into England, these two stories are not necessarily incompatible, for Oliphant may have been the Ralegh of the cigarette (cf Penn's remark below). However, recent research (C. Brookes 1969) shows the Gloag story as traditionally presented has at least some inaccuracies, for the first reference to his business does not appear until 1860 and his premises are successively at Deptford Lane, 40 Boyson Rd, and Boundary Rd, of which only the last two are in Walworth. Further, this area of Walworth was still undeveloped land in 1856, and Boyson Rd only appears on maps ca.1871. Nevertheless, an 1890 interview with Gloag (Anonymous 1890; quoted in part in Mackenzie 1957: 266) is probably accurate enough when it refers to him as "originating the cigarette trade in England". According to this account, Gloag commenced manufacturing cigarettes in 1854, the year he returned from the Crimea, but there is no indication this was in Walworth; indeed, Gloag's address is not given, and the only reference to Walworth is a comment that Mr Gloag, then 65, had "for many years" been a churchwarden at St Peter's, Walworth. As a business's first appearance in a trade directory need by no means be the date the business was actually founded, there seems no good reason not to accept 1854 as the date Gloag commenced cigarette-manufacturing, whether at Deptford Lane or at a still-earlier address. Penn does not mention Gloag but notes that cigarette-smoking was introduced by English officers returning from the Crimea where they had adopted it from the French and Turks - he refers to Oliphant, who had apparently stayed in Russia, Turkey, and Austria for many years, as the "first well-known person who smoked cigarettes publicly in London" (Penn 1901: 197). Penn also quotes (1901: 89, 197) an unnamed writer as saying in 1845 that "the cigarette is rarely had recourse to [in Britain] save by foreign visitors".

Fairholt in 1859 mentions cigarettes being smoked in Spain and South and Central America, but makes no reference to their use in Britain (1859: 214) and he is a careful writer; but they must have been known in Britain by that time and indeed for some time before the Crimean War, for in 1845 a London cigar-merchant and tobacconist, Joseph Baker, referred to them and also said the Spanish paper for making them could be obtained from most tobacconists, and two businesses are known to have been making cigarettes by 1851, Bacon Bros of Cambridge, who have a ledger entry for the sale of cigarettes in that year, and H. Simmonds of Picadilly, who were making them about that date if not a little earlier (C. Brookes 1969). Further, the records of the London tobacco firm of Fribourg and Treyer first note cigarettes in 1852 (G. Evans 1921: 37); and Mackenzie (1957: 275) notes that the firm of Lambert and Butler had cigarettes in their stock book "before 1856". Dickens mentions them in 1854, though Apperson (1914: 180) and - perhaps following him - Heimann (1960: 204) suggest Dickens may have meant small cigars. Dickens is known to have used the two terms interchangeably in 1846 (Apperson 1914: 217-9). The term "cigaret", in company with "cigar", is used, but not defined, in an 1849 romance (Mackenzie 1957: 269). It seems clear, therefore, that the introduction of the cigarette has almost as much uncertainty attached to it as has the introduction of tobacco and pipe-smoking, and it is an example of how events only 50 years before Penn and Apperson were writing - and indeed even now only a century and a quarter ago - can become confused and ill-recorded.

Gloag's first cigarettes copied the Russian ones he had seen during the Crimean War. They were wrapped in yellow tissue-paper and had cane mouthpieces. The tobacco was Latakia dust, loaded into the paper wrapper from a thin metal tube, the wrapper ends being turned in to prevent spilling. These cigarettes were made up in bundles of ten and retailed at 6d (Anonymous 1890) - the slide-and-shell package was introduced by the American tobacco-magnate, James Duke, who invented the idea in the late 1880s (West (ed) 1953: 36). In the late 1850s and the 1860s and 1870s, Greek, Polish, and Russian cigarette-makers arrived in London to set up business. One of these was a Greek from Odessa, Theodoridi, who began manufacturing cigarettes in 1857 with another man who had arrived at the same time, Marcovitch; in the early 1870s John Wood, who was then the largest British cigarette manufacturer and had taken over Theodoridi's business in 1865, claimed Theodoridi was the first cigarette-maker to arrive in England (C. Brookes 1969). Many exotic varieties were produced: perfumed cigarettes, coloured ones to match ladies' dresses (cocktail cigarettes are not new), tobacco-leaf wrapped cigarettes, and ones with mouthpieces of various materials (West (ed) 1953: 35-6). Gloag introduced the cardboard mouthpiece - which was at first filled with Havana tobacco - and in 1865 introduced leaf-wrapped cigarettes (Anonymous 1890). He continued to produce his original hard-tipped form of cigarette into the C20, bringing out a vulcanite-tipped leaf-wrapped cigarette in 1897 and a "patented novelty" cherry-wood tipped variety called Bedrock in 1905 (West (ed) 1953: 36). The books of Fribourg and Treyer record hardly any cigarettes sold until 1866, when Russian cigarettes, a large part mouthpiece and little tobacco, became popular (G. Evans 1921: 37-8 and Morton 1935: 182). According to Gloag, the first great boom in cigarettes occurred in 1873, when his firm introduced their "Don Alphonso Spanish Whiffs" which were sold in bundles of 25 for 1s; these proved so popular that sales soon exceeded 50,000 a week and frequently approached 100,000 (Anonymous 1890). (There are several early, straw-wrapped, cigarettes in the W.D. and H.O. Wills museum in Bristol.)

The London Post Office Directories do not mention cigarettes until 1870, and the following year W.D. and H.O. Wills of Bristol commenced cigarette manufacture, at their London branch, with their Bristol brand (not the same as the brand of that name introduced in 1955). Almost certainly in 1883 Wills began to use in Bristol the American Bonsack cigarette-making machine which had been patented two years previously (their Passing Clouds cigarettes first appeared in 1874, their The Three Castles in 1878, Gold Flake in 1883, Wild Woodbine in 1888, and Capstan in 1893). In the 1870s, therefore, the modern cigarette was just beginning to become popular; but it was not until 1888 that cigarette sales reached a significant level, 100,000 lb of cigarettes - still only 0.2% of the total United Kingdom tobacco-consumption by weight - being sold that year. By 1900, however, 11,300,000 lb of cigarettes representing 13.8% of total United Kingdom tobacco-consumption by weight, were sold, a rise in popularity in large measure due to Will's five-for-1d Woodbines (Till n.d.: 25, 28; West (ed) 1953: 36; Alford 1973: passim; Enc. Brit. 1966 ed: vol 5, 768). (Cigarette manufacture is described in A.H. Dunhill 1954: 37-45, 1961 ed, also in Anonymous n.d.[21]; N.R. Wright (1970: 4) describes the operation of an early C20 cigarette-making machine used by a Lincolnshire manufacturer.)

Corti (1930: 252-4, 1931 ed) says that the first true cigarette was manufactured in Austria in 1865, although ca.1850 a "paper cigar" was put out by the Austrian Régie. The former was called a double cigarette, was about three times as long as a normal modern cigarette, and had a mouthpiece at either end. It was cut in the middle to give two cigarettes. The following year, 16 million of these were sold in Austria, but they were soon supplanted by the single cigarette. By the late 1880s the latter were supplanting the cigar in Austria.

There was a cigarette-factory in Havana in 1853, and cigarettes are noted in New York in 1854, but they appear to have been virtually unknown in the northern United States before 1860. In that year the first machine for shredding or cutting tobacco appeared, but was little used. In 1865, the first year for which records were kept, ca.18-20 million cigarettes were produced. A crude machine for rolling cigarettes was exhibited in 1876, but the Bonsack machine of 1880 was the first practical mechanical cigarette-maker, producing nearly 100,000 a day. Girls hand-rolling cigarettes made, it was recorded in 1883, between 15 and 18 thousand a week. In 1880, over 500 million cigarettes were being produced annually in the United States (a little more than a fifth the total number of cigars produced); by 1885 this figure had doubled and by 1895 it had octupled. It was this period which saw the cigarette-card war among companies and the attempt by the American, James Duke, to obtain a world monopoly in cigarettes. However, cigar-smoking was also increasing rapidly from the time of the Civil War in the United States into the first decade of the C20, chewing-tobacco - which was by far the most common method of taking tobacco in the United States in the C19 - continued to be produced in ever-increasing amounts until ca.1900 (see p.74 above), and the use of smoking-tobacco was increasing into the second decade of the C20; and it was not until ca.1920 that cigarette consumption in pounds of tobacco per capita equalled that of other means of taking tobacco - smoking-tobacco, chewing-tobacco, and cigars - all three of which were running approximately equal by that date. By 1938, however, cigarettes were totalling half the tobacco consumed, and by 1950 three-quarters.

In Britain cigarettes accounted for only one-eighth by weight of the tobacco consumed in 1900, and did not exceed the 50,000 lb mark until 1888, despite the American cartoon of 1876 already noted (p. above) as showing Queen Victoria with a cigarette. This merely proves that what strikes a commentator or cartoonist as being all the rage need only be the unusual, not the standard, a point which should be borne in mind when considering comments on early pipe-smoking in the late C16 and early C17. However, by 1919 the weight of cigarettes sold exceeded that of all other tobacco sold (compared to the United States where it was only about one-sixth of the total), and by 1950 it was four-fifths (based on Todd (ed) 1957: table 1.1, 1966 ed; Heimann 1960; 7th chapt; Bagnall 1965: chapts 2 and 3; Enc. Brit. 1966 ed: vol 5, 767-9; Lewine 1970: first two chapts).

Both in the United States and Britain, WW I and military tobacco rations stimulated the cigarette's popularity; but the outlook and social habits of these countries is also reflected, for the increased speed of modern civilization makes the small, handy, cheap, and quick cigarette increasingly practical and relegates the pipe and cigar to the study and fireside.

(g) PORCELAIN PIPES

Although Fresco-Corbu (1963: 424-5) maintains that it was only in the 1760s that this "new type [of pipe] of purely German manufacture" (as opposed to imported English and Dutch clay pipes and German imitations of the latter) was produced, with the Meissen porcelain factory records first noting them in 1765 and Meissen and the factory at Nymphenburg, a suburb of Munich, selling them in quantity by 1770 and the Fulda and Berlin factories producing them soon afterwards, there seems no doubt they were being produced very much earlier, indeed from the beginning of porcelain manufacture in Europe. True, hard-paste, porcelain was first successfully manufactured in Europe at Meissen 1708-09, and according to Honey (1934: 45, 1954 ed) among the first experimental pieces from the factory to be exhibited, at the Leipzig Easter Fair of 1710, was a pipe-bowl. E. Zimmermann's Meissner Porzellan of 1929 (cited in Brongers and Van der Poel 1970: 159) also says pipe-bowls were being produced as early as 1710; and other references clearly indicate their production during the first half of the C18 (Honey 1934: 113, 193-4 n.191; cf Brongers 1964b: 172). The claim of a Dr Johan Franz Jacob Vicarius that a manufactory of these bowls was established at Vienna in 1693 (noted in Bastien 1973: 2nd chapt) must certainly be wrong, for as noted above Meissen was the first European centre to produce porcelain and was doing so only from 1708-09 - Vienna was in fact the second European centre to produce porcelain, commencing in 1719 (Honey 1952: 647), but there appears to be no reference to any earlier production such as any soft-paste, imitation, porcelain (as noted when discussing the German pipe industry in 3: III below, one source (Cassidy 1895: 22) claims that 200 years previously - i.e. ca.1700 - a Dr Vikarius (sic) had "'invented' - accidentally - the jointed pipe-stem", presumably the idea of the stub-stemmed bowl with an attached stem of a different substance, but neither Cassidy nor Bastien cite their sources).[21]

In all probability the manufacture of porcelain pipe-bowls spread when the capture of Meissen during the Seven Years' War, 1756-63, resulted in the spread of porcelain manufacture in general to other parts of Germany (Hackenbroch 1954: 111-3). Porcelain pipe-bowls also appear to have been made in France in the C18 (Brongers 1964b: 172) and in the C19 (Anonymous 1856a: 93). The typical bowl form is an elongated version of the "capless acorn" form of Dutch bowl which Friederich (1964d: 4 figs btm rt) dates from

1690 and which certainly occurs in archaeological contexts of the earlier C18 (e.g. I Walker 1971c: passim; FIG 158 btm centre). This form becomes the standard basic shape for Dutch pipes certainly until the later C19, and the porcelain version appears to have become equally standard in Germany.

Mayhew (1861-62: I, 440, 1968 ed) records porcelain pipe-bowls being sold in England in the middle of last century, when they were known as "china bowls" and were sold along with "comic head" pipes (the latter made of pipeclay with the bowls in the form of a head and face, often in caricature). As Mayhew records the "china bowls" were sold for 6d each while the "comic heads" were sold at 2d each it would seem the former were aimed at those with more expensive tastes, but it may be suspected that the clientele of the street-sellers Mayhew is recording, as with the cigar-vendors noted earlier, were predominantly of the lower classes. (According to Mayhew, the "china bowls" were of "white stone china", which indicates they were of one of the porcellaneous-glazed C19 imitations of porcelain or "china"; this reinforces the impression they would have been for predominantly lower-class use and were probably cheap.)

An observer of the same period (Anonymous 1856a: 94) says that porcelain pipes came into England in 1814, at the end of the Napoleonic Wars. Those made by English potters in imitation were found to give such an intolerably hot smoke, this source continues, that they could not be used, and porcelain pipes were thereafter imported. Being of porcelain, the bowls were non-absorbent, which made for a hot and strong smoke; but the reason for the intolerably hot smoke given by English porcelain bowls was probably because they would have been made of bone china, basically a hard-paste porcelain body with bone ash added and a characteristically English form of porcelain which had been used from 1749 and had been perfected by Josiah Spode II ca.1800, which has less heat conductivity than the true hard-paste porcelain which would have been the body used by German manufacturers (I owe this observation to Miss D. Griffiths, who is in charge of ceramics research with the Research Division of the National Historic Parks and Sites Branch, Department of Indian and Northern Affairs, Ottawa). A hot, strong smoke never appears to have been popular in Britain - Bastien's claim (1973: 3rd chapt) that in Britain polychrome porcelain pipe-bowls "were in great vogue, the country producing at that time [C19?] bowls of excellent quality" is certainly not correct - and a writer in 1876 (quoted in Fresco-Corbu 1963: 625 and Scott and Scott 1966: 35) gives his opinion in no uncertain fashion:

> The execrable china pipe is the mystery of the German. It has no absorption. It is a mere tobacco-still, condensing the fetid juices in its reservoir which must be frequently emptied and cleaned, or it is converted into a hubble-bubble of disgusting poison.

The selling of porcelain bowls by street-vendors is perhaps surprising in view of their relatively high cost, but it is possible that it may reflect a taste for a hot and strong smoke instead among the poor who could not afford much tobacco.

By the 1870s the porcelain bowl could be described as "the favourite of the German peasant" (Enc. Brit. 9th ed 1875-89: XIX, 112), suggesting perhaps that its use was predominantly lower-class, meerschaums (see above) presumably being the preferred pipe with upper classes. From 1860 porcelain bowls were being mass-produced from presses (Brongers and Van der Poel 1970: 154-5, 159), certainly suggesting cheapness; and in the 1870s the Ruhla area of Thuringia, which was the centre of the German meerschaum pipe industry - and to judge from figures, had a considerable percentage of the rest of the German pipemaking industry - was producing far more porcelain bowls than any other class of pipe, including meerschaums (Enc. Brit. 9th ed 1875-89: XIX, 111-2). Production figures were as follows:[22]

genuine meerschaums	540,000
artificial meerschaums	5,400,000
"wooden" bowls	4,800,000
porcelain bowls	9,600,000
"fine white clay or lava" bowls	2,700,000
"complete pipes of various materials"	15,000,000

Porcelain pipe-bowls have occasionally been recovered from North American sites, for example Fort Laramie, 1834-1938 (R.L. Wilson 1961: 125, 120 pl I, 1-2 and 1971: 8-9, 59 fig 2,A-B), and Fort Sanders, 1866-82 (R.L. Wilson 1971: 49, 80 fig 37), both in Wyoming; Fort Union III, New Mexico, 1863-91 (R.L. Wilson 1966: 40, 39 fig 6,G-H); and Bellevue Farm on San Juan Island, Washington state, which was established by the Hudson's Bay Company in 1853 to supply their fort at Victoria on Vancouver Island and abandoned by them in 1872 when the island was ceded to the United States, the farm being taken over by American settlers (Ferguson 1975b: 178).

(h) BRIER PIPES

The use of wood for pipes appears to have been known from early times. A wooden pipe dated 1620, originally with a silver mouthpiece, is in Birmingham City Museum and Art Gallery; whether genuinely of this date is uncertain. In 1692 wooden pipes, along with tin ones and conventional clay pipes were given to Indians (quoted in A. Deane 1914: 4). In the C18 Kovâcs, the alleged inventor of the meerschaum pipe, was said to make wooden pipes in one version of the story (A. Dunhill 1924: 234); and cherry-wood and willow amongst other types have been used (e.g. A. Dunhill 1924: 240-1; Weber 1962: 28; Brongers 1964b: 171-2). Wooden stems were known on clay pipes (Duhamel du Monceau 1771: 2) and became standard on German porcelain pipes (Weber 1962: 42; Brongers 1964b: 172). Tobias Smollett noted a French count smoking a wooden pipe in the south of France in 1765 (N&Q 25 April 1885: 323). According to one source, the Germans for a long time used pipes elaborately carved from the root of the dwarf-oak by the inhabitants of the Black Forest, but that the meerschaum had supplanted it (Anonymous 1856a: 93). (The brier-pipe firm of Dunhill, London, have among their extensive collection of antique pipes a very elaborate four-piece wooden pipe with carved faces of dogs and Amerindians which is alleged to be the pipe Ralegh smoked to the scaffold in 1618 (seen by this writer 1971; the pipe is illustrated in Herment 1952: pl 18, 1965 ed). The pipe was bought for 75 gns at an auction in 1911. It was said to have been given by Ralegh to Bishop Andrewes of Ely, subsequently of Winchester, whose family kept it for many years; the family of the owner who had auctioned it was supposed to have had it for some 200 years. A parchment relating to the pipe was said to have been lost some years before the auction (for this story see Apperson 1914: 22-3). In the opinion of this writer, however, the pipe is almost certainly of south German origin and C19 or later C18 in date - its shape, and the reservoir for tobacco juices, suggest this. Fresco-Corbu (1968: 846, 848) has independently agreed with this, noting very similar examples with spurious dates carved on them - one reading 1602 - and romantic legends attached. Fresco-Corbu suggests a Swiss or Tyrolean origin and a mid-C19 date. A number of similar pipes are in the Tabacologisch Museum of Niemeyer, the Dutch tobacco firm in Amsterdam.)

The origin of the brier pipe, like that of the meerschaum pipe and the cigarette, is given in an apocryphal story which nevertheless enshrines certain elements of truth. As with the story about the cigarette, it shows how easy it is for legend to appear in less than a century. After the death of Napoleon in 1821 there grew up a hero-worship cult, and from the 1830s and 40s it was popular to go on pilgrimages to his tomb at the Invalides and to Corsica. The story goes that one such pilgrim, a pipemaker, went to Corsica and there broke or lost his meerschaum pipe (in one recounting of the story the date for this event is given as 1825). He commissioned a Corsican peasant to carve him a pipe from a suitable wood, and this pipe, carved from the burl of the white or tree-heath or bruyère[23] (Erica arborea), was so successful that the pipemaker took home with him samples of the wood. These he sent to a factory in Saint-Claude, a French village in the Jura, which had been famous since medieval times for wood-carvings and where he was in the habit of obtaining wooden stems for his pipes, and there had the wood carved into bowls. This was in the early 1850s, and Saint-Claude thus became the centre of the brier pipe industry (A. Dunhill 1924: 242-6; Weber 1962: 28-9; Scott and Scott 1966: 39). A garbled version of this tale (Le Pailleur 1947: 666) makes the hero of the story Napoleon himself, breaking his pipe while on a visit to his native Corsica.

Although there appears to be no truth in this story, a date in the 1850s for the introduction of the brier pipe does appear to be correct. As the above story notes, Saint-Claude was famous for wood-carving, being renowned in the C17 for its snuffboxes, and about the beginning of the C18 was also making stems for clay and porcelain pipes made in other areas. Further, it seems likely that pipes of local wood (beech, maple, and later box) were being made towards the end of the C18 - the earliest known reference to wooden pipes made in Saint-Claude occurs in a catalogue of 1806, and following that date pipes became an increasingly important product of the Saint-Claude wood-carving industry (the information in this and the following paragraph comes from a mémoire done in 1960 for the Department of French at the University of Edinburgh on the Saint-Claude brier pipe industry by Miss S. Ripley; I am very grateful to her for supplying this information. Bastien (1973: 3rd chapt) follows Miss Ripley's account so exactly that one must assume he had access to her work, though he makes no mention of it).

The story associating the brier pipe with the Napoleon cult appears, significantly, to be unknown at Saint-Claude. Unfortunately, no direct evidence of a definite date survives, but there are three local stories - two of them in effect versions of the same one - and these, together with other historical evidence, unanimously point to a date in the mid-1850s. It has also been said that the superior qualities of the brier pipe were first brought to the public's attention at the Exposition Universelle of 1855 in Paris, but though Saint-Claude artisans won many prizes at the exhibition there appears to be no surviving detailed list of the items they displayed. The Chambre Syndicale of Saint-Claude accepts the date of 1856 and in 1956 celebrated the centenary of the brier pipe industry.

Two of the three traditional stories agree that at the Beaucaire Fair in 1854 a trader from the south of France met Saint-Claude wood-workers and persuaded them to experiment with the brier root for pipemaking on account of its hardness. (Beaucaire is near the mouth of the Rhône, between Avignon and Arles - the root would have had to come from the Mediterranean area, and this is certainly a more likely explanation than the story recounted by Dunhill above.) In one of these stories a specific Saint-Claude turner, one David, is mentioned; and in 1856 or 1857 it is known that this David and the Jeantet family went into business as apparently the first brier-pipemaking establishment in Saint-Claude. The third story was recorded in the notes of a person who had been apprenticed to the Maison Gay Ainé in Saint-Claude from 1857 to 1859, and this person is quite definite and detailed in his assertion that a merchant, again from the south, showed M Gay at the beginning of October 1858 a pipe made from this wood and that in the last week of that month the Gay firm were shipping finished pipes to Paris, northern France, and Belgium.

This last story notwithstanding, it appears that the brier pipe was being made prior to 1858 as there is other evidence to add to that noted above. One Saint-Claude firm, C.J. Vergnet Frères, advertising in the London Post Office Directory of 1895, stated they had been making brier pipes since 1857 (Fresco-Corbu 1968: 850); and Fresco-Corbu suggests there may have been other firms in business two or three years before this since Fairholt (1859: 198-9) noted that when he was writing, brier pipes were "now common in our shops, but expensive, the bowls costing about three shillings each".[24] Fribourg and Treyer first record "Briarwood Pipes" in their books in 1859 (G. Evans 1921: 37) - not, as Mackenzie (1957: 259) says, 1879. However, Nuremburg in Germany was another important centre producing brier pipes, at least by ca.1880 (Enc. Brit. 9th ed 1875-89: XIX, 112).

In 1892 there were 66 brier pipe factories in Saint-Claude employing 1,600 workers plus 500 women and 200 children, and by 1920 4,500 out of a population of 12,000 were working in the pipe industry (Ripley). When A. Dunhill was writing (ca.1924), 30 million pipes a year were being made, of which 90% were for export, the French then as now being a predominantly cigarette-smoking nation. Subsequently, however, Italy took over the production of cheap briers (Mackenzie 1957: 255), and by 1956 the number of people associated with the industry in Saint-Claude had dropped to 2,000 out of a population of 13,500 (Ripley).

The first maker to appear in England is said in one source (Anonymous 1966a) to have been a Frenchman who set up business in 1879, but the London Post Office Directory first mentions a brier pipemaker, Joseph Koppenhagen, in 1862. The firm of Loewe and Company Ltd advertise "a century of making the famous Loewe pipe" and claim to have been established in 1856, but inquiries to the firm have failed to ascertain the accuracy of these statements, or the origin of the firm - their name suggests a German or Swiss origin. However, the first-noted London firm, Joseph Koppenhagen, became Koppenhagen and Loewe in 1866 and Loewe some years later (Fresco-Corbu 1968: 850), which indicates Loewe was associated with the brier pipe business at least by the mid-1860s. (Catalogue 17 (1972) of the Brussels bookseller *Le Grenier du Collectionneur* lists (item 432) a brochure of the Loewe firm and refers to Loewe as a Frenchman who in 1854 became the first to introduce brier pipes into Britain.)

Kaywoodie Pipes Inc., the American tobacconists and pipemakers, use the slogan "world's finest since 1851" to describe their various tobacco products and specifically say "World's Finest Pipes Since 1851" (Anonymous n.d.[7]), but enquiries to the firm as to evidence for the type of pipe produced in 1851 brought no reply.

In 1878 the vulcanite mouthpiece was invented by an English firm, though it was the Germans who established a monopoly in supplying these parts until WW I (A. Dunhill 1924: 247).

Brier pipes have been recovered at Fort Berthold II, North Dakota, 1858-ca.1880, one apparently machine cut and originally fitted with a cap or cover (G.H. Smith 1972: 155-6, 152 fig 74,o); at Fort Vancouver, Washington state - with vulcanite stems - in a context of ca.1860 or later (Caywood 1955a: 59); at Fort Union III, New Mexico, 1867-91 (R.L. Wilson 1966: 40); at Fort Stevenson, North Dakota, 1867-94, where one had a "hard-rubber" stem (G.H. Smith 1960b: 226, pl 54,j); and at Fort Calgary, Alberta, Canada, apparently in the area of the original fort of 1875-82 (Anonymous 1970a: 3). A retired American Brevet Brigadier-General, describing in 1900 (in generalized and idealized fashion) American army life sometime in the period 1865 to ca.1900, claimed that

> Most of our officers on the frontier are habitual smokers, but very few smoke to excess. With many of them a brierwood pipe is used instead of a cigar, as it is easily carried on a march, is quite as good a smoke, and costs less, while the cigarette has comparatively little standing (Forsyth 1900: 114; I owe this reference to my former colleague, J.P. Wilson).

Brier pipes were certainly reaching the American West very shortly after their initial manufacture in Europe, for the *Bertrand*, which sank in the Missouri in Nebraska in 1865, was carrying briers as well as clays (Petsche 1974: 72; Hamilton and Hamilton 1972: 5). These briers are surprisingly modern in form, closely approximating the Large Full Bent of the present-day brier-pipe industry, which has a Billiard (also known as an Egg) bowl shape; the shape may in fact have been the European form from which the English Billiard and Apple shapes were adapted (I am very grateful to Alfred Dunhill Ltd of London *in litt.* 30 April 1974 and S.M. Frank and Co. Inc. of Yaphank, New York state, *in litt.* 25 April 1974 for a discussion on the *Bertrand* bowl shapes). Their stems are of wood; the bits appear to be an early version of the normal modern brier-pipe bit, similar to that known on French and German clay pipes (see p.176 below and FIG 117) (this description is based on a photograph in the files of the Interpretation Division, National Historic Parks and Sites Branch, Ottawa, showing five complete briers from the *Bertrand*). An inventory of merchandise for the Hudson's Bay Company's Elbow River post in Alberta dated 1 May 1878 notes "Briar root no. 2" pipes (Dempsey 1973: 46).

In addition to the references above, curved "hard-rubber" stems were found at Fort Berthold II, one attached to an octagonal bowl of unspecified material which had originally had a meerschaum or similar liner (G.H. Smith 1972: 156, 152 fig 74,n). A curved saddle-bit "hard rubber" stem designed to receive the stub stem of a bowl came from Kijik village in southern Alaska, which was occupied until the beginning of the C20 (VanStone and Townsend 1970: 129, 127 pl 23,9); a curved stem with a threaded end designed to screw into the stub stem of a bowl and apparently of bone was found at Fort Laramie, Wyoming, 1834-1938 (Beaubien 1951: 13); while two curved "hard-rubber" stems were found at the Custer Road Dump site associated with Fort Mackinac on Mackinac Island, Michigan, in the two earliest layers, dated to 1876-79 and 1879-80, and two straight bone stems with threaded ends occurred in the topmost layer, dated to 1893-95 (Brose 1967: 60, 61, 51 pl VI,I upper and lower and H, 69). At Fort Walsh, Saskatchewan, Canada, 1875-83, three short amber[25] stems, two at least designed to have the stub of a bowl screw into them, have been discovered (excavations conducted 1973 by the Research Division of the National Historic Parks and Sites Branch, Ottawa): the bone and "hard rubber" stems almost certainly belonged to brier pipes, the amber stems could have gone with either a brier or a meerschaum pipe - in either case these last suggest some rather expensive tastes.

As the C19 progresses it becomes more and more difficult to paint a broad picture of the methods of tobacco-taking because of its spread to countries which were developing different traditions and because of the increasing number of ways in which tobacco was being taken. In discussing clay pipes one now has to consider the complex ramifications resulting from trade to an increasing number of countries as well as the adverse impact on the industry of other methods of taking tobacco.

For example, as noted in Sub-section (e) above, cigar-smoking in the United States was increasing rapidly from the 1860s into the first decade of the C20, and according the Heimann (1960: 153-4, 160-1, 163-4, 193, 139-40, 236) pipe-smoking was a relatively minor method of taking tobacco in the United States in the C19 before the American Civil War, 1861-65, becoming important only in the last quarter of the century; but to judge by the number of clay pipe fragments found on most American archaeological sites of the mid- and later C19 pipe-smoking was commoner than one might suppose from Heimann's remarks. Further, the early arrival of briers in the United States - by 1865, as evidenced by the Bertrand cargo noted above - suggests pipe-smoking had a certain social standing, which in turn suggests Forsyth's comment that briers were commonly used by American army officers in the later C19 (above) is not inaccurate. In view of the lack of any major United States clay pipe industry (there are few statements on American clay pipe manufacture, but from the overwhelming number of foreign-made pipes found on C19 American sites excavated it is safe to assert this) it is not surprising that some British clay pipemakers, notably those in Glasgow (4: IV), were able to offset loss in home demand with increase in oversea demand. Archaeologically speaking, direct evidence for a change from clay pipes to briers would be rather difficult to discern, for clays are relatively cheap and expendable, which results in large numbers of fragments being found (cf p. 3 above), whereas briers are durable, more valuable and thus less commonly lost, and only rarely thrown away (one may also suspect that on an excavation remains of briers are less readily recognizable than are clay-pipe fragments (cf R.L. Wilson 1966: 40): however, as noted when discussing the Glasgow industry (p.344 below), there is evidence that the heyday of its export trade, at any rate to North America had passed before 1891; and it may also be noted that the Montreal clay pipe industry, which mushrooms in the third quarter of the C19 and is known from archaeological finds (4: V) to have exported to the United States, declines as rapidly in the last quarter of the century, and although the cigarette was certainly increasing in popularity at this time (see Sub-section (f) above) the decline of the Montreal industry and of Glasgow's North America trade may well be at least in part because of the impact of brier pipes on the market.

Other points which can be tied into the diverse aspects of C19 smoking habits will be noted as they arise in this study.

SECTION VIII:
TOBACCO CONSUMPTION

As already noted when discussing cigars in the previous section, there is unfortunately some confusion among various authorities on figures for tobacco consumption, particularly for the period from the late C18 into the earlier C19.

Clapham (1926: 246, 1939 ed) says that the amounts of tobacco imported and consumed in Britain at the end of the C18 and the beginning of the C19 fell, partly because of the wars of this period but also because the loss of the American colonies put out of business those who had hitherto had an interest in keeping the tax on tobacco at a reasonable level. This, together with the fact that tobacco was an obvious luxury, led to high taxation to assist in financing the wars. There was, he continues, an appreciable fall in tobacco consumption in England between 1811 and 1821, but by 1831 the figure had almost returned to the 1811 level; in Ireland, however, this fall was much more marked and in 1831 the figure there was still only two-thirds of that for 1811. Clapham gives the tax on tobacco in 1811 as a fraction over 2s2d per lb; for the period 1820-26 it was 4s, in 1826 it was reduced to 3s, and during the period 1827-31 it was 2s9d.

Rive, however, while agreeing with Clapham as to the most accurate tax figures for each year (that is, the rate at which the greater part of tobacco imported was taxed - for a more detailed statement of these figures see Alford 1973: 475 table IX), has consumption figures which are at variance with those of Clapham (Rive 1926: 72-3). Rive's per capita consumption figures for Great Britain suggest there was no real change, save for occasional fluctuations, during the period from the 1790s to the 1820s. As Rive notes (1926: 74), per capita consumption figures are official only from 1855, figures for earlier years (and also for the period of WW I) being estimates only; but in the later 1780s, when Rive's estimates begin, 0.7 lb per person per annum is his figure and from 1790 to 1825 the figure hovers on either side of 1.0 lb. Estimates for the United Kingdom are available from 1815: these figures for the period 1815-25 (at which latter date Rive's estimates for Great Britain alone stop) when compared with those for Great Britain are consistently lower by ca.0.2 lb - some 3 oz - which indicates that consumption in Ireland must have been very much lower at this time than in Britain.

According to Rive (1926: 73) per capita consumption in the United Kingdom between 1815 and 1841 remained at between 0.9 lb and 0.8 lb; but Deane (1965: 250) gives figures which show a decline of almost a quarter over this period, from 19 oz in 1811 to ca.14-1/2 oz in 1841. Alford in his recent study of the Wills tobacco firm and the United Kingdom tobacco-industry, feels that "Figures for per capita consumption in the nineteenth century are not considered to be very useful, since it is impossible to distribute changes in levels between individuals' consumption and alterations in the total number of smokers" (Alford 1973: 458): his index of tobacco-consumption for 1789-1900 shows a rapid rise in the earlier 1790s after which it fluctuates but with no long-term losses or gains, though with several sharp declines and rises - declines in 1796 and 1798, a rise in 1797 and another 1803-13, a decline in 1814 and a rise in 1815, a decline 1819-22 - until the 1830s, when the figures begin to climb, slowly and somewhat uncertainly at first but with increasing rapidity after the early 1840s (Alford 1973: 472 and 115).

These indices can be interpreted as broadly agreeing with the pattern of Rive's figures, including agreements on fluctuations, though Rive's figures present a curve of a very much lower profile. For example, Rive's per capita figures from 1815 are, as already noted, in the 0.8-0.9 lb range and they remain so - with the single exception of the year 1821, when the figure drops to 0.7 lb (cf Alford's decline of 1819-22 above) - until 1845, when 1.0 lb is reached for the first time; and it is only after 1852 that Rive's figures show a steady rise. One reason why Rive's figures appear insensitive, however, is his use of relatively gross fractions: 0.1 lb is 1.6 oz, a sizeable amount in this particular frame of reference and, as figures quoted below by Fairholt and Penn indicate, one much too large to catch any normal annual fluctuation. Clapham's decline of tobacco-consumption from 1811 and its revival by 1831 probably reflect the declines and rises noted above for this period by Alford; Deane's figures are probably an error caused by her taking Rive's or some equivalent figure for Great Britain in 1811 - Rive's figure of 1.2 lb for that year approximates her 19 oz - and comparing it to a figure for 1841 for the United Kingdom (cf remarks above), for which year Rive gives a figure of 0.8 lb, an amount a little less than Deane's ca.14-1/2 oz but comparable with Fairholt's 13.21 oz (see below).

As noted above, Fairholt (1859: 323, quoting the Journal of the Royal Statistical Society vol XVI) gives ten-yearly figures for tobacco-consumption in ounces for the years 1821-1851 and Penn (1901: 211) continues these figures to the end of the C19, and these figures seem to give a much more sensitive picture of the trend towards increasing consumption throughout the century than do Rive's, despite Alford's reservations on all per capita figures. From 11.71 oz per head in 1821 the figure slowly rose to 13.21 oz in 1841, and then with increasing rapidity to 16.87 oz to 1851, 25.00 oz in 1891, and 31.75 oz in 1900. (Fairholt says the figures are for "England", but probably the United Kingdom is meant.) A more detailed outline of this increase in tobacco-consumption is given in the following table (the Alford indices are based on 1870=100):

	Rive	Fairholt-Penn	Alford
1821	0.7 lb	11.71 oz	38
1831	0.8 lb	12.80 oz	47
1841	0.8 lb	13.21 oz	53
1851	1.0 lb	16.87 oz	67
1861	1.2 lb	18.88 oz	84
1871	1.4 lb	21.49 oz	103
1881	1.4 lb	22.60 oz	118
1891	1.6 lb	25.00 oz	145
1900	2.0 lb	31.75 oz	190

(Penn also (1901: 215-6) gives figures for tobacco-consumption in a number of European countries and in the United States for - apparently - 1891. The figure given for Britain, 1.34 lb per capita - differs somewhat from the figures noted above, but even with the above figures substituted no fewer than seven countries had a higher rate of consumption, The Netherlands leading with seven lb and the United States following with five. Austria, Denmark, Switzerland, Belgium, Germany, Norway, France, and Sweden - in descending order - had a per capita consumption of two lb or over. According to Penn (1901: 137) the reason for the high Dutch figure was that Dutch tobacco - much of it home-grown - was milder than, for example, American tobacco. According to Penn it would be "physically impossible" for a Dutchman to smoke the same amount of American tobacco as Dutch, though the figures given, being per capita, do not represent accurate consumption per smoker unless the proportion of smokers to the total population were similar in The Netherlands and the United States.

The tobacco-consumption figures for Britain clearly indicate that whatever happened to the clay pipe industry in the C19, it did not decline for lack of tobacco being smoked. The popularity of snuffing in the previous century, however, does appear to have brought down the per capita tobacco-consumption figures for that period. Assuming a population of 5,800,000 in 1700, Rive gives a figure of just under two lb a year, a figure which had been more than halved by the 1780s (Rive 1926: 63, 72). Penn (1901: 84-5) quotes a source for the first decade of the C18 giving a figure of over two lb. Snuff-taking involved the use of much less tobacco, and snuff-manufacture also utilized the plant stalk, to say nothing of more dubious material which was frequently added to make the snuff more pungent (see n.12 above). In modern times the best snuff is made from the whole leaf, but cheaper varieties are made chiefly from the stem (A.H. Dunhill 1954: 111, 1961 ed).

Unfortunately, as has been noted in preceding sections (pp33 and 43 above), there is a gap in the records of the amount of tobacco imported into England between 1640 and 1689 and also one in the records of the amount of tobacco exported by Virginia between 1641 and 1688. A comparison of both sets of figures for the years immediately preceding and following these dates, however, indicates that the amount of tobacco being handled had increased 11 to 14 times between ca.1640 and ca.1690. How much of this amount included tobacco for re-export is unfortunately unknown; by the period 1689-1709 three-fifths of the annual average of 28 million lb imported into England was so designated (Rive 1926: 61). Whether this increase in the amount of tobacco imported during the period ca.1640-ca.1690 was a fairly steady one cannot be found from figures, but there is some suggestion from clay pipes that it may not have been, or at any rate that there was a more rapid increase from ca.1660 onwards than had been the case prior to that date, for it is from this time that clay pipes begin to increase quite rapidly in size for the remainder of the century (cf FIGS 1-6). This possible correspondence between pipe-bowl size and availability of tobacco might be a worthwhile topic of research on its own; Atkinson (1965c: 87, rev ed 1969b; 1971: 181) has already suggested that the increase in the size of bowls towards the end of the C17 was because tobacco had become very much cheaper (cf figures for the cost of an oz of tobacco at various times in the C17 cited on p.33 above). Certainly the bowls produced by Bristol makers in the 1650s are little if any larger than Bristol pipes of the earlier C17 (cf Appendix IX *passim*). (Some work on bowl capacities was carried out by Miss E.A. Wylie of the Research Division of the National Historic Parks and Sites Branch in Ottawa in 1967 under the general supervision of this writer, but it has never been sufficiently refined to produce practical data and has never been continued). A quite different suggestion for the smallness of pipe bowls - and also for the length of their stems - has been proposed by Heimann (1960: 63-4), namely that the strength of the unrefined tobacco of the period prevented its use in larger amounts. So far as this writer is aware, no work has been done on the early cultivation, processing, and blending of tobacco, or on attempts to grow milder-smoking varieties and improve methods of curing the leaf; this should certainly provide a separate research project.

To judge from the rapid increase in tobacco imports during the C17, however, the amount consumed in pipe-smoking in England must have risen enormously, even allowing for a growing re-export trade in tobacco, and the ca.1700 per capita figures given above must be about the maximum - a figure of two lb was in fact not again reached until 1900. This gives additional support to the view that the beginning of the C18 was the heyday of the clay pipe (and thus probably of clay pipe manufacture) and that as the C18 progressed the pipe industry began to contract. In 3: I, other evidence for this is given - including a source quoted by Fairholt that Queen Anne's reign shows the height of pipe-smoking - and as discussed in Chapter 6, the Bristol industry was declining from ca.1740 onwards until the beginning of the C19. The Broseley industry also seems to decline greatly during the second half of the C18 (Oswald 1970b: 227). Even the Chester industry (4: III), said in the late 1700s to have produced the best pipes in Europe, had lost most of its trade by the beginning of the C19, and it is clear that the decline of the pipe industry at this time is countrywide (see pp260-1 below). The only centre unaffected appears to have been Liverpool, for reasons which will be discussed in 4: II.

The amount of tobacco an "average" smoker consumed in earlier times is unfortunately impossible to estimate. Sheppard (1902: 4-5, 1912 ed), quoting the household account book for 1709-14 of one Charles Warton of Beverley Parks, Yorkshire, notes that in one year Warton purchased 24-1/2 lb of tobacco. If Warton used all the tobacco himself then 24-1/2 lb averaged over a year would give a figure of slightly over one oz a day. Sheppard says there is evidence in the accounts that Warton was miserly and unsociable in character, and suggests he smoked all the tobacco himself, but the evidence of his purchases of pipes (dealt with in 6: I) suggests he must have entertained at times, and it is likely his average tobacco-consumption a day was a little under one oz.

There appear to be no accurate figures available for the quantity of tobacco a modern "average" pipe-smoker consumes. Pipe-smokers and tobacconists consulted give figures ranging from half an ounce daily to a little over one oz. The crucial factor is the price of tobacco and its relation to wages. Warton paid 1s8d for a lb of tobacco, a sum which would have been more than the daily wage of a labourer of the time. Today (post-November 1968) the price of tobacco varies very widely with its quality, but taking ca.7s9d as the cost per oz of a good but by no means exclusive pipe-tobacco, a lb would cost ca.£6 4s, a figure which in relation to today's wages is surprisingly compatible with Warton's figure compared to wages of his time. Warton's figures give the price of an oz of tobacco at ca.1d: no indication is given as to what quality of tobacco Warton smoked, but he did buy good-quality pipes as well as cheaper ones. Some support for the figure of about an oz a day tobacco consumption or possibly higher comes from a writer in 1703 who commented (quoted in Penn 1901: 84) that "in two miles' compass may be found a thousand families or persons in country villages that one with another do smoak, snuff or chaw the year round one penny a day, and most of these coal or lime men, firemen, etc.": as Warton's tobacco at this time was costing ca.1d an oz this observation, while not necessarily exact, suggests even the poorer classes could afford 1d a day for tobacco. At Warton's prices this would give a figure of approximately an oz a day; if, as is perhaps likely, they used cheaper tobacco than Warton did, this price might indicate an amount up to double that quantity. (The manufacture of modern pipe-tobaccos is described in A.H. Dunhill 1954: 45-52, 1961 ed; also in Anonymous n.d.[22].)

Regarding an average quantity of snuff, G. Evans (1921: 17) suggests that a half oz a day, for individual use, "would possibly be a very moderate allowance, and below average" - this presumably was for last century. Evans goes on to note the last snuff-taker of consequence purchasing from Fribourg and Treyer used ca.3 oz a day but says he "took snuff to excess and very frequently handed his snuff-box to friends". Somewhere between 1 oz and 1-1/2 oz, therefore, was probably an "average" daily consumption of snuff last century.

CHAPTER 2

MANUFACTURING PROCESSES

SECTION I:
METHODS USED IN NORTHERN FRANCE

The manufacture of clay pipes has attracted very much less attention in the literature than have the pipes themselves. Indeed, the only detailed account of pipe-manufacture appears to be the monograph *L'Art de faire les pipes à fumer le tabac*, written by H.-L. Duhamel du Monceau two centuries ago (Duhamel du Monceau 1771). This account, dealing with pipemaking in northern France and in The Netherlands, was comprehensively summarized by the Diderots in their *Encyclopédie*,..., where the majority of Duhamel du Monceau's illustrations were also reproduced (Diderot and Diderot 1751-72: IV, 375-8, plates in vol I *Supplément* pls 1-4 and vol VIII pl xviii); and the section on Dutch pipemaking was also summarized by M.G. Jars in his *Voyages métallurgiques*,... of 171, though with only four, and different, illustrations (Jars 1781: III, 369-72 and pl 13).

The manufacturing processes described by Duhamel du Monceau are set out in minute, if somewhat heavily-written, detail, and for the purpose of this study the accounts have been abridged and entirely reorganized (see Appendix III for an explanation of the use of foreign terminology in this and other sections of this chapter). At its simplest the process was as follows. The clay was first soaked in tubs of water to make it soft and malleable. It was left in this state for half a day only, during which time it was worked over with a *louchet*, a sharp-edged instrument like a small spade. The clay was then spread on, a table in a layer about six ins thick and puddled (that is, made impervious to water) by being beaten with an iron bar. The amount of time needed to effect this depended on the quality of the clay - the finer the clay, the longer the time, as the finer clay took longer to become pliant. Half a hogshead of very fine clay could take four hours' beating; the same amount of coarser clay, two hours. After this, the clay had become paste-like, and was ready to be worked.

However, at Dunkirk (*département* of Nord), the preparation was a good deal more complex in order to turn out pipes to rival those made by the Dutch. From the writer's own work on the English and Dutch pipes excavated at the C18 French fortress of Louisbourg, Nova Scotia, Canada, there can be no doubt that even the cheaper brands of Dutch pipes were superior in appearance to most English pipes (I. Walker 1967c: 187 fig 1; 1971c: *passim*). In 1696 a tax of 5s per gross of 144 (a gross in pipemaking varying at various times in the manufacturing process) was put on foreign pipes by the English government (7 and 8 Gul. III C.31, XLIX). This must have been aimed at Dutch pipes, and suggests they were feared competitors of the home-made variety. Houghton, writing in 1696 (1st page), notes the superiority of Dutch pipes. (In The Netherlands, or certainly at Gouda, the chief Dutch pipemaking centre, pipes were made in three classes - *slegte* (ordinary), *fijne* (fine), and *porceleyne* (porcelain). These represented three ascending qualities, and even the lowest, on Louisbourg and other evidence, was better than that of most English pipes. The "porcelain" quality was in fact that of a highly-polished pipe (Helbers and Goedewaagen 1942: *passim*), not made of porcelain, and not to be confused with the true porcelain pipes manufactured in Germany from the first half of the C18 onwards and based in shape on Dutch pipes.)

The pipe manufacturers in French Flanders and Artois (approximately the départements of Nord and Pas-de-Calais) mixed several of the local clays with the superior ones from Andenne (east of Namur in modern Belgium) and Autrache (now Hautrage, north of Mons and also in Belgium) as the duty imposed by the Austrians - most of the area then being part of the Austrian Netherlands - and the cost of transportation made it impossible for the French to produce pipes of Andenne and Hautrage clays at a price competitive with foreign-made pipes. The proportions of clays used varied with the place of manufacture and the type of pipe made, but at Dunkirk pipes imitating Dutch "fine" examples were made of two parts Andenne clay to one of English clay, while at Saint-Omer (Pas-de-Calais) they were made with equal parts of Hautrage and Desvres (Pas-de-Calais) clays, and at Valenciennes (Nord) with equal parts of Hautrage and Pau clays. (Pau has not been identified - no place of that name can be traced in NE France or in modern Belgium, though it is extremely unlikely that it can be any of the three known Paus elsewhere in France as they are all in the southern or central parts of the country.)

Essentially, pipemakers tried to use local clays, or failing that, those nearest (Duhamel du Monceau 1771: 5-7). At Forges-les-Eaux in the Pays de Bray NE of Rouen (Seine-Maritime), clays from Forges-les-Eaux itself and elsewhere in the Bray region (e.g. la Bellière ca.2 miles away, Gournay-en-Bray ca.12 miles away) were used. An observer of the Dieppe industry in 1789 (quoted in Bastien 1973: 2nd chapt) noted that the clay used there came from the Neufchâtel-en-Bray area, ca.20 miles SE of Dieppe and ca.10 miles NW of Forges-les-Eaux. At Rouen pipemakers used clays from Saint-Aubin, some 6 miles up the Seine from Rouen, and nearby Elbeuf.[1] The Dutch used clays from the Liège[2] area - which must mean Andenne - and the Cologne region. Brongniart (1854 ed: II, 180) says when summarizing this information from Duhamel du Monceau that makers at Givet (Ardennes), Saint-Omer, and Dunkirk, and also those in The Netherlands, used clays from Devres, Andenne, Hautrage, and Vallendar near Coblenz - Vallendar is ca.3 miles down the Rhine from Coblenz and approximately halfway between Coblenz and the Westerwald pipemaking area and clay deposits (see Section IV below). This is rather farther upriver than Cologne, in which region there were also important deposits of white-firing clays (see 2: IX).

At Dunkirk, the batteur (literally, beater, but the term is not known in the English industry), who was responsible for preparing the clay, accepted it and put it in a storehouse, preferably a loft, preparatory to being worked. The storehouse had windows which were opened to provide a draft of air when the weather was dry and were closed when it was damp. The clay came in cloth-lined baskets of the same capacity as those used to measure the clay in the mine, and was placed on planks if the storehouse was paved or tiled. The walls of the storehouse were lined with planks or matting to prevent the clay from touching the dampness or the lime on the walls, and to speed drying the lumps were placed on edge and apart from each other. The clay had to be as dry as possible before being soaked in water, hence the use of the windows referred to above. To keep the clay free from impurities, the batteur removed his footwear before entering the storehouse.

The preparation of the clay involved mixing and crushing, then soaking, pressing, and beating. The workshop had a bench and three iron-hooped wooden tubs (FIG 12,l-n). The bench was a solidly-built piece on four legs joined to each other and braced in one corner of the shop. The tubs were placed side by side in a line, and both they and the table were on top of planks, which prevented falling clay from picking up impurities from the floor. These planks were kept scrupulously clean by the *batteur*.

The equipment used by the *batteur* comprised: a *maillet de bois* (wooden mallet), *mandes* or *mannes d'osier* (wicker baskets), an *écumette* (skimmer), a *palette* (paddle), and *étampe* or *dame* (rammer), a *razette* (scraper), a *battoir* (club), a *brosse de crin* (a horsehair brush), and a *barreau* (bar).

The mallet (FIG 12,a) was used to crush pieces of clay that were too big before they were put to soak in one of the tubs. The obvious foreign matter was removed and pieces with gravel or iron stains were stored for *raccommodage des pots* - "pot repairs" - though what precisely this means is uncertain (this is discussed later). The wicker baskets, cloth-lined (FIG 12,b), were used to carry clay to the storehouse, as already noted, and to carry it from the storehouse to the *batteur*. The skimmer (FIG 12,j) was a circle of iron pierced with holes and with a handle attached; over it was laid a horsehair strainer or a fine brass-wire mesh screen. This was used to remove small impurities released by the clay during soaking which had floated to the top. The paddle (FIG 12,f), which was the same as the *louchet* previously mentioned, was a spade-like implement used to work the clay, and to move it from one tub to another and from the tub of the bench. The rammer (FIG 12,e) was used, in the same manner as the tampers formerly used to compact the fill of a hole dug in a road, to press the clay in the second tub. The iron scraper (FIG 12,h-i) was used to remove the clay from the rammer, and from the table after it has been beaten there with the bar. The club (FIG 12,g), very similar to the instruments formerly used to beat washing, was of wood and was used to beat the clay in the third tub, and to form the beaten clay into cubes. The brush (FIG 12,k) was used to sweep the bench before the clay was placed on it, and the bar was used to beat the clay on the bench. The bar (FIG 12,c-d) weighed 15 or 16 lb and was triangular in cross-section with one face 11 *lignes* wide and the other two faces, which were slightly convex, 2 ins wide.

Having made his choice of clay from the storehouse, the *batteur* broke the lump of clay into pieces about the size of a hen's egg with the mallet to make it easier for cleaning and soaking. The wicker basket was filled with these pieces and taken to the workshop, where the lumps were put in the first tub, which was filled to "about six fingers' width from the top". The tub was then filled to its top with water (experiments had shown that there was no difference between hard and rain water for this purpose). This task was generally done in the evening so that the clay could be left soaking overnight. The impurities - such as straw, wood chips, and the like which floated to the surface - were removed next morning with the skimmer, and the paddle used to cut and turn over the clay to ensure it was thoroughly soaked. The impurities rising to the surface as a result of this were again removed with the skimmer. When the clay was completely soaked, a channel was made in it to a hole in the tub side controlled by a tap, and the excess water run off.

The soaked clay could not be used by the *rouleurs* (literally, rollers, but the use of the term is unknown in Britain, at least to the present industry) and the *mouleurs* (moulders) until it had reached a certain consistency, either by evaporation or by mixing in dry clay to absorb the moisture. As the latter was quicker, the soaked clay was mixed with *scraabes* (spew) - trimmings from the pipes before they were fired - or fragments of unfired pipes, carefully collected and dried by the *mouleurs* and *trameuses* (trimmers).

Clay from the first tub was transferred to the second by the paddle and laid in a layer ca.3 ins thick. The surface was smoothed and the dry spew laid on top in a layer about ca.2 ins thick. The paddle was used to chop and mix this with the soaked clay; the strokes of the paddle were always made one at right angles to the previous one. Following this, another layer of soaked clay was laid on top of the mixture, and another layer of spew, and the whole mixture was again chopped and mixed with the paddle.

The next step involved the use of the rammer, which was used to compress the four layers until it was judged from the lessening volume that the spew had soaked in the excess moisture and become partially incorporated with the other clay. Then two layers of soaked clay were added, and two layers of spew; again this was chopped and mixed with the paddle, and again the rammer was used. Finally, yet more layers were added (the amounts are not specified) and the mixture rammed for much longer than on previous occasions - about quarter of an hour.

The next process was to *scraabter* the clay in the third of the tubs. The clay was lifted from the second tub with the paddle, and every three or four shovelfuls were beaten for a moment with the club. This was continued until all the rammed clay had been transferred. This process further mixed the spew and the better this was done the less time was needed for the next, and the most tiring, process, the beating of the clay with the bar.

By this time the clay was workable, but the spew were still not mixed in enough to hide its different colour. With the paddle, about 100 lbs of the clay was spread on the bench, the latter having first been cleaned with the brush. The clay was then beaten with the bar, first with the broader sides to reduce the thickness and then with the smaller face, starting at one end and finishing at the other, and leaving three-quarters of the thickness of the back of the bar between each blow (FIG12,o). The clay was then taken up with the scraper and laid so that the next beating was at right angles to the first, and following this the clay was relaid and beaten yet again in the original direction. A piece was then cut with a brass wire, and if it still revealed uneven colouring was given a fourth beating.

After being beaten and collected, the clay was put together and shaped with the club into rough cubes weighing 80-100 lb (FIG 13,a). The blocks were placed beside the bench on a form, and examined by the master-craftsman, who cut open some of the blocks with a wire to see that they were perfectly homogeneous. From there the *rouleurs* took the clay - under threat of fine they had to inform the master-craftsman if there were any impurities or unmixed colour in the blocks. In the best factories the *batteur*'s workshop was beside those of the *rouleurs* and moulders.

Minor variations to the method were noted at several other centres in the area. At Tournai in modern Belgium a *piqueron* (FIG12,p), a long cylinder of wood with conical ends, was used instead of the club.
The *batteurs* at Tournai disposed of still-dry parts of the clay during the

beating process by spraying them with water which they held in their mouth - because the water was sprayed so well, the method was known as *des brouillards* (mists). At Tournai, and also at Valienciennes and Saint-Omer, a square-sectioned four-sided iron bar with one-ins wide faces was used to beat the clay: this weighed ca.20 lb, some 4-5 lb more than the Dunkirk *barreau*, and made the work even harder than it was with the Dunkirk bar as the square bar stuck more to the clay, but the beating was better done and finished sooner.

The *batteur* was expected to prepare every day enough clay for 16 moulders and to set aside poor-quality clay for *raccommodage des pots* as well as to take in the unworked clay and look after it in the storehouse, and to look after the spew which the workers collected and put in the storehouse. For this he was paid a monthly wage of 40 *livres*. (Subsequently, Duhamel du Monceau notes that a skilled moulder could produce ca.20 gross of pipes a week, which - assuming a six-day week - means a little over three gross a day. Thus 16 moulders would have made over 50 gross a day, and as half a hogshead of clay was needed for 26-27 gross pipes, the *batteur* would have had to prepare a whole hogshead of clay each day in addition to his related duties, a task which probably explains why his pay was approximately double that of the highly-skilled moulder).

The *rouleurs* took some of the clay and, on a smooth table, rolled out a *rouleau* (FIG 13,b) - roll, as it is generally called in the English industry. This was said to be the most skilled part of the process, as the exact amount of clay - the "nip" as it is called in English - for each type of pipe had to be accurately gauged by experience. These rolls were made in batches of 15 called a dozen, and stacked in a pyramid (FIG 13,c). By this time they were firm enough to be turned over when being dried.

When the right consistency had been reached (this was judged by experience), the rolls were detached and the bore made by the moulder with a *broche de fer* (iron wire) (FIG 13,e). The wire had its end slightly flattened and widened, and the progress of the wire through the stem as the stem was pulled over it was followed by the two fingers between which the stem was held. The wire was exactly the length of the mould, but initially not quite its entire length was put into the roll (FIG 13,d). The thickened end of the roll, which was to form the bowl, was then turned upwards, and the roll and wire set in a copper mould which had previously been oiled to prevent its sticking to the clay (FIG 13,f).

This mould imparted the shape and decoration to the roll, and its two halves were pinned together through holes made for this purpose. It was then placed in the press (or chest, as it is called in the English industry). This comprised a base and two sides in one piece of heavy cast-iron and inside it a plate of polished iron and another of wood (FIG 13,i). The iron plate was pushed by means of a screw against the mould which rested against the wooden plate, in its turn resting against the side of the press (FIG 13,h and j).

This formed the stem, but the bowl was still to be made. To do this the worker first used his index finger to spread the clay in the mould which was to form the bowl. He then took the *étampeux* (stopper) and inserted it (Coolen (1970: 390), who is following Duhamel du Monceau, uses here the term *étampeur*). (As this instrument had a T-handle to it, it was presumably turned round in the mould to form the bowl - as will be noted later, latex moulds of the insides of Dutch bowls also indicate that the stopper was turned inside the mould.) The stopper was acorn-shaped, and to prevent it from penetrating too deeply and damaging the heel (which had already been moulded with the stem) a leather washer was solidly attached round the stopper at its junction with the cup of the handle to prevent farther penetration. The mould was then taken out of the press, the wire pushed through to the bowl to complete the bore (presumably the stopper was removed immediately after it had formed the bowl, though this is not stated), and the pipe removed from the mould (FIG 13,l). The pipe was then ready for an initial trimming, this being done with an estriqueux (finisher's knife, but in this case more than the English tool of that name) (FIG 13,m). This was a multi-purpose instrument, having a hook at one end for trimming and smoothing, a curved point at the other to remove the "dottle" or "pep" (as it is called in the English industry) of clay left in the bowl by the wire's coming through, and - set on an arm obliquely to the handle - a copper or iron blade to trim off the excess clay of the stem. Following this stage, the wire was removed and the pipes set aside to dry (FIG 13,n).

When the pipes reached a certain consistency, they were taken for further trimming - the irregularities of the bowl were removed and the lip of the bowl rounded off with a bouton (button) of copper or horn (FIG 13,o). The button fitted over the bowl, having a lip to overhang the top of the bowl, a groove to take the bowl top, and a nipple fitting the mouth of the bowl - it was placed over the bowl and turned. The pipes were next placed back in the mould to straighten them and then arranged on trays which had a groove on either side to take the heels of the pipes (FIG 10,p). After this they were left until they were hard enough to take the final polishing, to be given the maker's stamp, and to have a serrated edge added round the lip of the bowl.

The polishing was done with two pebbles called pierres de torrents (a term for which no equivalent appears to be known) in which two channels, to take the size of the stem and of the bowl, had been formed. The manufacturer's mark was made on the stem with an iron blade engraved with the desired design and lettering, and this was passed several times round the stem. The denticulation was put on with a fine saw which was run round the lip of the bowl, using the button as a brace. When there was decoration imparted by the mould the worker touched this up with an iron point. The pipes were then set aside to dry.

A skilled worker was able to make ca.20 gross (that is, ca.3,000) pipes a week, being paid five sols a gross. This gave him a weekly wage of about five livres and a monthly wage roughly half that of the batteur. It was said that with half a hogshead of prepared clay it was possible to make 26-27 gross pipes.

A variety of kilns could be used to fire the pipes, the next stage in the process. In Rouen, according to Duhamel du Monceau's source, small kilns were used. These started at five or six ft in height and were circular, tower-like, constructions. At their base was the furnace, and above this but inside and separate from the outer wall was the pot or chambre holding the pipes. This was in fact a muffle kiln, the muffle (the pot or chambre) being heated through its base and sides (FIGS 13,r-s and 14,t-u). The fuel used was dry deal, which gave off a strong heat with little smoke.

The pipes were stacked almost vertically on their bowls round a hollow clay tube called a chandelier or fuseau (literally, a spindle or pintle) (FIG 15,t, cf FIG 18,y) which fitted over a vertical iron shaft and which had grooves on which to rest the stem ends. The stacking was called to empoter (potting). To stack a number of tiers of pipes gassettes (a variant of casette, a saggar) or boisseaux (literally, bushels) - open-ended cylinders 10 or 12 ins in diameter (FIG 15,r-s) - were used. These were set one atop the other round the central shaft, and the pipe bowls were set against the saggar wall with their stems on chandeliers set one above the other on the shaft. The pipes were arranged so that the first three or four tiers sat on their bowls and the next tiers had the bowls uppermost. This allowed the kiln to be used to its maximum capacity - 19-20 gross. The part of the kiln holding the pipes was then closed with dorures (gildings) - sheets of heavy paper smeared ("gilded") with liquid clay - which was supported by defective, already fired, pipes. The outer mantle was closed with tiles and a chimney put on to take off the smoke and heat. Firing took six or seven hrs. (As is noted later, muffles used by English pipemakers were made of pipe-fragments cemented together with clay, apparently pipeclay. The actual clay used for these Rouen muffles is not stated, but the inferior-quality pipeclay noted earlier as being set aside for raccommodage des pots may have been used for making and repairing the pot or muffle. It is likely it was also used for the dorures.)

After firing, the two tops were removed, leaving the kiln about four ft in height, and a large plank or tile was put over it to retard the escape of the heat, and allow the pipes to cool gradually. This operation was called to depoter.

The large kilns, however, functioned differently. They were up-draught kilns, large square structures, rather like brick and tile kilns (FIGS 14,y and 15,x). Above the furnace, but not cut off from it, was a chamber where the pipes were stacked in fireclay boisseaux in the same manner as in the small kiln previously described - Duhamel du Monceau's illustrations show nine such columns, each three boisseaux high (FIGS 15,u and 14,w). The cone of pipes at the top of each column was sealed with tiles, the doorway was bricked up, and the fires were lit. At first the fires were kept very low, then gradually increased, this continuing for 14-16 hrs. The fire was then allowed to go out and the door opened, but the pipes were not taken from the boisseaux until the latter were nearly cold, and until there was no smoke in the kiln.

Duhamel du Monceau listed the advantages of these kilns over the small ones as follows: they were solidly-built and durable, and needed little repair; it was not necessary to rebuild the top of the furnace each time; a large number of pipes could be fired at the same time; and the heat was applied directly the the boisseaux and was thus used more efficiently.

About 1730 a method was discovered at Saint-Omer for reducing the reddish tinge that clay from Menneville, just outside Devres, gave to pipes (Duhamel du Monceau 1771: 11-12; described in Brongniart 1854 ed: II, 186, 187 and in amplified form in Tomlinson (ed) 1852-4: II, 451). When the kiln was at full heat its chimney and all other openings were closed for three-quarters of an hour. This resulted in carbon being deposited on the pipes. The openings were then unstopped and the heat increased for quarter of an hour, during which time the pipes became red hot and the carbon was burnt off. This was repeated over a period of 22-24 hours and on the final occasion the pipes were left in the heat for an hour. Tomlinson noted that the effect of this was to change the red iron peroxide to a pale green protoxide the colour of which was scarcely noticeable, although the inside of the bowl, as Duhamel du Monceau also observed (1771: 9), remained slightly red.

The final check was to see that the pipe drew - that is, that the bore through the stem to the bore allowed air to pass freely.

At this stage the pipes had not received the finishing which was the most visibly characteristic feature of Dutch pipes and those imitating them. The common clays (as they are called in the British industry today) were dipped in a very liquid slip of fine clay which was allowed to dry on naturally. This increased the whiteness. They were then polished with a slightly rough piece of fabric.

However, a much better varnish was also used. Its composition was kept a secret, and it was given out that it was a boiling down of gallnuts mixed with whitening, but in fact, according to Duhamel du Monceau's informant, it was a mixture of soap, wax, gum, and water. A quarter of a lb of hard or soft soap, two oz of white wax, and one oz gum arabic (or, in another version, said to be better, a paste made from parchment) were boiled for three or four minutes in six-and-a-half Imperial pints (four Paris *pintes*) of water and then allowed to cool, the mixture being stirred with a bundle of twigs in order to break up the wax, which had not dissolved, into particles small enough not to reform on the surface of the water.

Another varnish used was apparently a mixture of oil, soapy water, and some animal or vegetable gum: this served, as did the others, to prevent the lips sticking to the porous clay, but it did not give as shiny a surface as that obtained when wax was used in addition.

The prices of pipes produced in the north of France varied considerably according to their size and quality; from six and a half to one and a half *livres* a gross.

The mid-C18 edition of Savary des Bruslons's *Dictionnaire universel*..., where the entry on pipes is probably basically early C18 in date (see p.54 n. 16 above), notes that pipes could come "varnished" in various colours, and describes Rouen-made pipes being packed for shipping in hay in small beechwood boxes generally of one gross capacity (Savary des Bruslons 1759-65 ed: IV, cols 199, 200).

In 1789, one Coquebert de Montbret gave a very brief description of the manufacture of pipes at Dieppe (quoted in Bastien 1973: 2nd chapt). A white-firing clay from Neufchâtel-en-Bray[3] (cf pp109 above and 430 below) was used; the method of preparation was kept secret. The pipe had a narrow, well-proportioned stem "*incliné en avant*" and probably ca.13 3/4 ins long (Bastien quotes the figure as ca.35 mm, ca.1 3/8 ins, which given the rest of the description is impossible, and it is probable the length cited was meant to be ca.35 *cm*). A boy made the roll, a workman made the bore through the stem, and the pipe was put in a copper mould to dry. The pipes were potted in a saggar "of the same clay" (as the pipes) and fired. The smallest were sold at 36 *sols* - one *liard* - a gross. This description is clearly much abbreviated and very inaccurate - moulds could not possibly have been kept out of production while pipes dried in them, for example - but the reference to the saggars being made of pipeclay, if correct, is of interest as this does not appear to have been usual.

A report in the Saint-Omer municipal archives by the then-proprietor of the Fiolet factory Louis-Maximilien Fiolet *père* to the Mayor of Saint-Omer, discussing the factory and its products at the time of writing, June 1819, has recently been discovered and published (Coolen 1971), and this affords some details on manufacturing processes of the period.

The factory them employed between 400 and 500 workers - men, women, and children over ten years old. The clay for pipe-making came from Jemappes immediately west of Mons, and Andenne, in what Fiolet calls the *département* of Sambre-et-Meuse, though this area, that round Namur, now in Belgium, had ceased to be part of France in 1814. The Dutch, M Fiolet said, also got their fine clays from these places. Common-quality pipes were made of Jemappes clay. All clay was carried to Saint-Omer by water (as it was, for example, into Staffordshire until at least the 1960s as being the cheapest method). Three hundred and fifty thousand kilogrammes of clay (ca.345 Imperial tons) were used a year. Saggars were made of clay from the Arras (Pas-de-Calais) region.

A pipe passed through 15 or 16 different pairs of hands before reaching the firing stage. Iron and copper for the presses and moulds were used in large quantities; and oil, white wax, and Castile soap were also used in very considerable amounts. Colza oil was used (as it is still used at Pollock's, the last surviving British pipe factory), 300 kilogrammes (ca.660 lb) in a year. The kilns were wood-fired, 70,000-80,000 large faggots being required in a year (later in the century, when the firm was at the height of its fame, the new factory used coal (Coolen 1970: 393)). The production of packing-cases to ship the pipes was apparently done in the factory, 60,000-80,000 planks being used a year.

According to Molinier (1899), clay pipe bowls and stems were made separately. One assumes this is in France, though this is not specifically stated. The stems were made either in a special press known as a *presse à columbins* or they could be rolled out from a ball of clay. A small piece of clay was then added at one end from which the bowl was to be made. The bore was made either with a strip of brass or a strip of oiled paper (though how the latter was used is not stated) inserted almost as far as the bowl, and the pipe put in a copper bipartite mould and set in a vice. The bowl was then made by forcing in and turning a copper *étampon*, which appears to have been the same as Duhamel du Monceau's *étampeux*. The wire was then pushed completely through to the bowl to complete the bore; the pipe was then trimmed and taken from the mould. If the stem was to be curved, this was done at this point, and the pipe left to dry slowly in the shade before firing.

Firing was done in cylindrical or rectangular kilns, the pipes being put in saggars covered by conical lids attached with a clay paste and the spaces between the pipes filled with a finely-ground fired clay. After firing, the porosity to the lips was lessened by dipping the pipe in water with a thin suspension of clay in it and then polishing the pipe when dry with a flannel. High-quality pipes were polished with a flannel dipped in a mixture of gum, soap, and wax disolved in boiling water.

A good deal of this description harks back to Duhamel du Monceau and Diderot, and it is difficult to know how much is an uncritical acceptance of these accounts as being relevant for the time of writing and how much is a genuine continuation of methods described in the C18 - undoubtedly some of the latter should be present, for C20 Belgian and Dutch pipemakers have been using substantially the same procedures as those noted by Duhamel du Monceau.

The Encyclopédie containing Molinier's article was published over the period 1886-1902, but in view of the cursory way in which wooden - including brier - pipes are dismissed and only clay and meerschaum pipe-manufacture described in detail, it is possible the article reflects information from an appreciably earlier period. Adolphe Bitard in his Les arts et métiers illustrés of ca.1885 (quoted in Colas 1959: 234-5 and without source given in 1962: 31-2; I have not yet been able to consult the relevant volume of the original) describes French pipemaking and notes bowls and stems being made separately - this source appears to have similarities to Molinier (see below). An English C19 encyclopaedia, Ure's A Dictionary of Arts, Manufactures, and Mines;..., also claims that bowls and stems were made separately, and so does a French encyclopaedia of similar date, Laboulaye's Dictionnaire des arts et manufactures...: unfortunately, this writer has been unable to obtain copies of the first or second editions of Ure's work (published 1839 and 1842 respectively), but if, as seems probable, their accounts of pipe-manufacture are the same as that appearing in the third (1848), fourth (1853), and fifth (1860) editions, then Laboulaye may have copied Ure on this point and perhaps also on the alleged firing of meerschaum pipes (see p.264 below), for the first edition of Laboulaye appeared 1845-47. The fifth (1881-82) edition of Laboulaye has an identical entry to that in the first; the kiln-illustrations in Laboulaye are identical to those in Ure, but the description of the manufacturing process is a condensed and generalized account of the Duhamel du Monceau-Diderot account. Like the later Molinier and like Brongniart, whose work first appeared in 1844 (i.e. before Laboulaye's encyclopaedia) though this writer has been able to examine only the second (1854) edition, Laboulaye refers to the use of a presse à columbins and an étampon, suggesting some copying among these works. Brongniart, at least in his second edition, also refers to pipes being made in two parts. In English-language accounts of pipes made in this manner, Sprague (1947: 1) is simply quoting Ure; I.J. Williams (1932: 140), allegedly describing the manufacturing methods used by the firm of Pardoe of Nantgarw near Cardiff, 1833-1920, claims this method of manufacture, though there is internal evidence in his description and elsewhere in the article to suggest he was not using first-hand accounts for some of his information.

Brongniart's account (1854 ed: II, 179-88) is of some interest because other evidence would suggest he was a careful recorder. He commences his description of pipemaking by saying (p.179) that he has not been able to study pipe-making in detail at first hand and will therefore rely largely on Duhamel du Monceau's account. There follows a compressed version of the latter, using the latter's illustrations. Where additional material appears

- for example, the observation (p.184) that a kiln at Gouda seen by the writer in 1835 was the same as that illustrated by Duhamel du Monceau, or that coal was now the fuel used there and not peat (p.185), or that a kiln at Forges-les-Eaux was similar in shape to that illustrated at Dunkirk by Duhamel du Monceau though its firing was different (p.185) - it is generally stated that this is from a different source, which makes the entirely casual remark - not borne out by the illustration referred to in the text (a Duhamel du Monceau copy) - that a ball of clay was added to the stem to form the bowl, the more curious.

It is possible that Brongniart did not read Duhamel du Monceau carefully and misinterpreted the illustration there and in Diderot which shows no clay for the bowl at the end of the roll in the mould (the bowl being formed, as already noted, by spreading the clay in the mould at the base of the opening for the bowl on to the walls of the mould). Indeed, the Diderots, in their summary of Duhamel du Monceau's account say (1751-72: IV, 377):

> Quand la broche est entrée de toute sa longueur, qui est celle même du rouleau, il donne un coup de pouce à la boule de terre d [referring to illustration] qui doit former la tête de la pipe, pour commencer à lui faire prendre l'inclination qu'elle doit avoir dans la moule.

While the expression la boule de terre means "the clay ball", it is quite clear from the text and also the illustration that this ball is merely the enlarged end of the roll; but it would not be difficult to misinterpret this remark at a hasty reading.

The problem is much complicated, however, by an additional set of illustrations in Diderot (vol VII pl XVIII and captions) unrelated to the article on pipemaking. The plate, entitled Potier de Terre, Outils et Pipes, illustrates a number of items connected with the preparation of clay not specifically for pipemaking, but also illustrates a Dutch pipe, a Rouen pipe, and a most peculiar process for apparently producing clay pipes. A piece of clay was rolled out to form a long, thin, rectangular piece: this piece was curved lengthways to form a trough, then completely curved to form a long tube. A collar - presumably of clay - was attached at one end. A brass wire mandrin - a term which normally means a punch, chuck, mandrel, or tamping-iron or -bar - was then inserted the length of the tube. How the bowl was made is not stated, though a moule - which is in fact not a mould but a type of stopper - is shown. Possibly the bowl was formed by moulding clay over the end of the stopper. Once formed, the bowl had the end which was to be attached to the stem curved to fit the line of the stem, and presumably (though this is not stated) the bowl was slipped on to the mandrin and the stem collar smoothed down over the stub stem of the bowl to effect the joint.

Frankly, a more Heath-Robinsonish way of making clay pipes can scarcely be imagined. The particular set of illustrations is not referred to at all in the section in the text for manufacturing pipes, and a narrow and delicate pipe stem, with a bore of probably ca.5/64 ins, could not possibly be manufactured by this method. This section of Diderot must, for the moment, remain an enigma.

As many C19 dictionary- and encyclopedia-compilers shamelessly rehashed earlier sources and exhibited little desire to check the then current manufacturing process, it is probable that inaccurate statements went unverified, to be perpetuated by later plagiarizers.[4] However, Brongniart (like Molinier, though of course the latter could have been uncritically following Brongniart), does refer to the stem blanks being produced in a *presse à columbins*. The word *columbin* is applied to a number of articles all suggesting a rolled-out cylinder from which blanks or the like would be cut; it is a technical term for what Pollock's of Manchester, the only British pipemaking firm still manufacturing (see later), call "strapping" - the strip of clay used to seal saggars to each other as they stand in the kiln. Derived terms such as *colombeau* and *columbelle* have similar usages (I am grateful to Professor D. McMillan of the Department of French, University of Edinburgh, *in litt.* 21 March 1969, for assistance with this term). It would appear, therefore, that a *presse à columbins* was specifically designed to produce rolls in the pipemaking sense: this might reinforce the argument that the stems were prepared separately from the bowls. T. McLuckie of Glasgow provisionally patented a machine in 1874 which made stems and bowls separately, but the invention, which was to give a socketed joint in any case, appears never to have gone farther. Nevertheless, it seems unlikely both on grounds of complexity and time involved and because of structural weakness in the pipe, that such a method would commend itself to pipemakers. Bitard's description of ca.1885 quoted by Colas (above) notes that the stem could be prepared either by a *moule à la presse* or by hand. This work was done by a boy, who then added a small ball of clay to one end of the stem and passed it on to a workman. He took an iron or brass needle dipped in oil, placed it in the centre of the stem, and carefully pushed it centrally through the length of the stem. When the wire was a little more than half-way in, the roll was in a bipartite copper mould and an *étampoir* used to form the bowl by pressing in and turning. The wire was then pushed fully in to complete the bore to the bowl. The pipe was then trimmed and removed from the mould, and was then ready for ornamentation or marking before being polished. Relief ornamentation was mould-imparted, impressed decoration was put on with an embossed roller. There was a special treatment (not described) for parts of pipes to be glazed.

If the stem was to be curved, this was done when the pipe was taken from the mould, it being then still moist enough for this. After this the pipes were put in the shade to dry. They were then fired in special small kilns holding 3,500 to 4,000 pipes at a "moderate" temperature for eight to nine hours. The pipe was then in a "biscuit state", which was best for smoking and also for seasoning and colouring.

When cool, ordinary pipes were dipped in a clay slip, dried, and rubbed with a flannel; higher-quality pipes were polished with a varnish of gum, wax, and soap mixed with water, and rubbed dry with a flannel.

This description, as noted above, has similarities to that of Molinier, though the two accounts are not identical. Although no technical terms are noted - beyond possibly *étampoir*, which does not appear in the dictionary - and it is almost certain that the roll would have been pulled over the wire, not the wire being pushed into the roll, there are elements which suggest careful observation: for example, the reference to the wire being inserted "a little more than half way" into the roll before the latter was placed in the mould. The problem of whether to accept the statement that pipe-rolls were made in two parts, one for the stem and the other for the bowl, therefore becomes more acute; the overriding factor, however, still is that there seems no reason why a more complex process, and one which would have tended to cause a structural weakness, should have been used in place of the normal simple one-piece roll.

At Givet (Voisin (ed) [1950]: 11th-14th pages), the Gambier firm soaked their clay for a fortnight in vats of ca.30 cubic metres' capacity in cellars. The clay was then taken out and placed in heaps for another fortnight. After this month it was adequately hydrated and put through a pug-mill. These mills, originally worked by horses, were hand-turned until some time before WW I, when electric motors were introduced.

The clay was now ready for the pipemaker, and young workers were responsible for making rough-outs of the bowl or whole pipe (depending, presumably, on whether the final product was to be a bowl and stub stem only or a complete clay pipe). The rolleur or rouleur then made the rolls on a small plank, the "bench", "dozening board", or "bunch board" of the British industry and the rollenbank of the Gouda industry (see Sections VII and II below respectively).

The rolls were set aside to dry for two or three days, and then sent to the mouleur for moulding. As late as 1913 the superbly-made Gambier moulds were engraved in the factory by a specialist in this line. In the manufacture of the normal clay pipe a long wire needle was first used to make the stem bore, the bipartite mould was closed in a vice, and the bowl formed by the schtoup (stopper), which was inserted by hand and forced the excess clay out the mouth of the mould.

The next process was the tramage (trimming). The wire was left in the pipe to facilitate handling, and was pushed through to join the stem bore to the newly-made bowl. The trameuses (trimmers - feminine) removed the mould-lines with a curious and un-named tool in the form of a pair of tongs between whose ends the pipestem was passed. The pipes were left to dry for a few days and then polished with an agate.

The next stage was the empotage (potting) and firing. The pipes were placed in superimposed layers in cazettes (saggars) made in the factory and each layer was covered by silicious sand or ground-up fired pipe-fragments (the accompanying drawing shows them embedded vertically bowl down, but this seems unlikely). Latterly the kilns were coal-fired, but until the closing years wood was used. Firing with wood was an arduous task for those involved, as the fuel had to be continuously fed to the kiln (an account of glassmaking at the French plate-glass works at Saint-Gobain in Picardy in the first quarter of the C19 (noted in Knowles 1927: 343-5) records that the faggots of beechwood used as fuel were thrown into the furnaces by men stripped of all superfluous clothing running round the furnace at a speed "equal to seven leagues in six hours"). The saggars were placed in staggered rows one above the other with the fire heating through vents from underneath, according to the accompanying drawing, and each kiln produced several thousand pipes. By 1913 there were only one or two firings a week, which implies firings had formerly been more frequent (the number of kilns is not stated). According to the account, wood-firing gave a temperature of

"200 ou 300 degrés" and firing continued from four a.m. to nine p.m.; the introduction of coal-firing halved the firing time. Presumably the degrees are centigrade, but 200°-300° is much too low a firing temperature even if Gambier products according to a source of 1866 did have a reputation for being fired "souvent un peu faible" (quoted in Jean-Léo 1971: 15), and must be an error: other evidence points consistently to 940°-1,000°C or even higher - 1,100°C being recorded at Andenne - as the firing range for clay pipes (see Sections II, III, and VII below). Indeed, it is doubtful if a pipe fired to 200°-300°C would be of any use at all; they would certainly have been extremely brittle (cf Sections VII and IX below.)

After firing, the pipes were taken in baskets to the émailleuses - women who enamelled them in various colours. This form of decoration was distinctively Franco-Belgian and German last century; it never appears to have been a British or Dutch trait. Though common on pipes seen by this writer in Belgian and French musuems (which tend to collect objets d'art rather than less spectacular examples), and on German pipes seen while visiting the Westerwald, no such decorated pipes have been found archaeologically in Britain or North America to this writer's knowledge; French pipes found on excavations appear to have been the plainer and presumably cheaper varieties. Each émailleuse mixed her own enamel with a combination of gum tragacanth, powdered coloured glaze, and water; a thin enamel was used for brush work, a thick enamel when using a steel point.

When enamelled, the pipes were again fired to fix the glaze. The kiln was heated white-hot to ca.1,000° and after three hrs was loaded with the enamelled pipes laid out in dozen lots on small plaques of sheet metal which were placed on fireclay trays stacked in the kiln. Because of the high temperature these trays had to be replaced every fortnight. The furnaceman judged the length of firing - ca.20 minutes - by experience, and when the pipes were removed from the kiln they were ready for use. (This would be enough to fire properly pipes already fired to 200-300°, as the Gambier firm is alleged to have done (see above), but it would not solve the problem of those pipes fired to 200-300° which were not enamelled and thus not refired in this manner.)

Certain types of pipes were specially treated to season them, being soaked in a preparation of alcohol, then dried, varnished, and wrapped, all done in the dark because when exposed to light pipes treated thus rapidly darkened. The footnoted remark that this work resulted in cases of severe alcoholism among those engaged in this work is scarcely surprising; unfortunately just how this coloured the pipe is not clear. Versions of this tradition may exist in the secret finish used by the London pipemaker Crop last century for his pipes and the habits of smokers soaking their pipes in beer or tea before use (see Section VII below). In 1867 an account noted "varnishing" in the manner described by Duhamel du Monceau - dipping the pipe in a mixture of soap, wax, and gum, and giving it a highly-polished finish by rubbing it with a flannel - but this was apparently later abandoned by the firm.

Best-quality pipes were wrapped in coloured tissue-paper and carefully packed in a case all of whose sides were protected with hay. Each layer of pipes was separated from the next by a layer of corn ears minus their grain. Ordinary pipes were packed in cases without the tissue-paper wrapping. In this manner they were shipped all over the world - as late as 1923 orders were sent to Canada, Japan, England, and The Netherlands.

From the description of the manufacturing process given in Voisin, it seems probable the Givet industry spread from that at Andenne in Belgium. As noted in Section III below the Andenne industry was started by a German pipemaker from the Westerwald in 1768 and the Andenne technical terminology bears this out. Certainly the term *schtoup* used at Givet for the stopper is Andenne-Westerwald, and probably the term *rolleur* (*rolleuse* at Andenne where women latterly did this work) is also as the pronunciation of the first part of the word is as in the English-Dutch-Westerwald-Andenne tradition as opposed to the more orthodoxly French *rouleur* noted by Duhamel du Monceau as being used at Dunkirk, where the terminology has been Gallicized more thoroughly than at Andenne. The trimming tool used, however, had no parallels known to this writer, and may possibly have been of local invention. (The spread of German-derived terms into Belgium and to Givet and Saint-Omer, where many Belgian workers were employed, is noted by Jean-Léo (1971: 8 and n.1): at Mons near the French border the term *schtoup* for the stopper was also used, while at Chokier near Liège the term *trumeuse* was used for the trimmer and is clearly a variant of *trameuse* derived from the Westerwald *Trümmerin*. At French pipemaking centres removed from Belgian influence, such as Montereau-faut-Yonne SE of Paris - though started with Saint-Omer families (Colas 1959: 234 and 1962: 31) - and Erôme and Marsailles in SE France these terms are not found, according to Jean-Léo, though unfortunately he does not give a complete list of French technical terms, noting only *rouleur* for the roller, *estampeux* for the stopper, and *trameuse* or a variant *tramasseuse* for the trimmer.)

At Forges-les-Eaux, NE of Rouen, black pipe-bowls were produced by refiring them at a lower temperature in saggars full of oak sawdust (the pipes in question were bowls with stub stems designed to take a wooden or similar stem). This produced a mat-black finish; a polished surface was obtained by coating the pipe in graphite and polishing it hard with a cloth (Brongniart 1854 ed: II, 187; also in Tomlinson (ed) 1852-4: II, 451). This is similar to the deal sawdust used at Andenne (Section III below) and the coal-dust used at Glasgow (Section VII below) to obtain black pipes. As in his description of the method used to remove the reddish tinge from pipes made of Menneville clay taken from Duhamel du Monceau and Brongniart (see above), Tomlinson offers a more detailed explanation of this blackening process. The saggers, he says, were partly filled with oak sawdust and placed in the upper part of the kiln, where there was less heat. The carbon from the wood coloured the clay but the temperature was not high enough to burn it off; the pipes came out of the kiln with a dull black colour and were then dusted with plumbago and rubbed hard with a cloth to polish them.

At the Musée du Tabac, Bergerac, a brass bipartite mould is displayed. This resembles those illustrated by Duhamel du Monceau quite closely, and has the depression near the end of the stem which Duhamel du Monceau mentions on Dutch moulds (though he does not mention it on French moulds) as being the mark from where the exact pipe length was measured - in other words, the short piece beyond this point was cut off after the moulding process. According to the guide book (Anonymous n.d.[2]: 6th page) this mould belonged to the Gambier firm and was saved from destruction during WW I; it is said to be of copper, but appears to be of brass (for the Gambier firm see 3: V).

There are also exhibited plaster bipartite moulds. How these were used is not indicated: they are extremely light to handle but must have been very fragile and certainly could not have stood the handling that metal moulds get when in the vice. On the evidence of the Van der Want pipe-factory at Gouda (see below) it is probable that these moulds were matrices for the production of fresh metal moulds. Moulds are no longer made in Britain or the Westerwald, but Gouda pipemakers still make their own moulds when necessary (see p. 112). (Plaster moulds are noted in North Carolina, and it has been suggested (Albright 1958: 20) that they were probably hand-used by when speedy or large-scale production of pipes was not necessary. This seems unlikely, however, and as Albright notes two iron patterns which were used to cast the pipe-moulds - the latter were made of brass or lead - it is likely that the plaster moulds were used to produce these patterns (see Sections II and VII).)

The brass mould in the museum does not have the slot in the top typical of British moulds and made to take the knife used to trim the top of the bowl, nor is this a feature on any of the moulds in the museum at Andenne illustrated by Javaux (1925: pls between pp22 and 23) or seen by the writer there in September 1969.

A brass stopper is also displayed at Bergerac, complete with the washer to prevent it penetrating too far into the bowl when being used. Unlike those illustrated by Duhamel du Monceau, however, it is assymetrical in shape, and must have been inserted by a straight-forward thrust. The top part has been squared off from its original cylindrical shape and must have been set in something, but no trace of this attachment now remains.

SECTION II:
METHODS USED AT GOUDA, THE NETHERLANDS

In the Netherlands, according to Duhamel du Monceau's informant, the method of preparing the clay was rather different (the descriptions are of Gouda factories). The clay was well dried, and powdered with a mallet; it was then soaked in water for one or two days. The excess water was then run off and the clay worked with an iron shovel until it was the consistency of thick paste. From this were kneaded loaflike pieces and these were pugged in an elaborate mill. This comprised basically a cylinder with a central shaft to which was attached horizontal blades holding vertical teeth. The central shaft was turned by horses (FIG 16,a-c) (cf Brears 1971: 92-3). When it was judged that the clay was sufficiently well mixed, a piece was cut with an iron wire. If the colour was uniform, the clay was ready for the rouleurs (Duhamel du Monceau does not refer to the Dutch workers by their Dutch terms). The clay was then formed into loaves ready for the rouleurs. (This procedure emphasizes the Dutch preoccupation with the perfection of their products, for their clay is more carefully and also more efficiently refined than by the method Duhamel du Monceau records for northern France.[5] This perfection was maintained throughout the pipemaking process, resulting in a superbly-finished product. One English observer at the end of the C17, commenting on a small number of imported Dutch pipes, said

> truly [they] are very fine. If there comes no more they'll
> do us no great hurt

and went on to urge they be used to set an example to English pipemakers (Houghton 1695/6: 1st page). However, even today, Dutch clay pipes are more finely made than English or any other clay pipes.)

(Brongers (1964b: 37) describes a slightly different but equally careful process. The clay was crushed, soaked in water, and mixed with broken unfired pipe fragments. It was then put through a mill. Following this it was stored in large cellars to macerate for about six months. This was then ground again and was then ready for the pipemaker.)

The rolling, and the moulding, differed in detail from the processes used by the French. The amount of clay for the pipe was again judged by experience - the pipe shown in the example given has a very much longer stem than the example given for northern France. The rolls (FIG 16,d) were made in batches of 24 (this was apparently not called a dozen) and stacked three rows deep (FIG 16,e). The clay used was firm, so that the pipes could be turned over and dried better without losing their shape or sticking to each other. The same type of wire with the expanded, flattened end was used (FIG 16,f), but to insert it (at least in the long pipes) the rolls were placed on a narrow wooden tray with sides which was attached to the work bench and sloped upwards away from the worker (FIG 16,g). The wire was oiled before use, a process not noted as being done in the northern French centres (though it seems likely that it was in fact done). The mould was of brass.

The mould described (FIG 17,i) was - apart from its length - fundamentally the same as that described as used by the French; however, the part shaping the stem was invariably thicker towards the bowl than at the mouthpiece. In the mould illustrated by Duhamel du Monceau - that for a pipe 28 pouces long (a fraction under 30 English ins) the stem thickness at the mouthpiece was two lignes (ca.3/16 ins) and at the bowl four lignes (23/64 ins). A small depression near the end of the mould on the stem indicated the exact length the pipe was to be. (The bowl for a pipe this size was two pouces in length and one and three-quarters wide.)

The chest (FIG 17,k) was exactly the same as that used by the French, except that several sheets of cardboard were placed between the wooden plate and the other side of the vice - Duhamel du Monceau said this was apparently because, adding give, they prolonged the life of the mould.

The bowl was made in the same manner as those in France (the Dutch stopper is illustrated in FIG 17,l), but the trimming was rather different. The Dutch used a handle of wood with a wire hook at one end and a blade set on one side (FIG 17,m). The hook was to trim the stem, the blade to cut off the excess stem at the mark left from the mould. Following this the pipes were arranged on a table with a groove on either side which took the heels. They were then left on trays (FIG 17,o) to dry for a certain time (a time judged once again on experience).

Those engaged in this work earned four to six Dutch sols per gross; those doing the rolling were paid rather more than the others. A gross here was 168 (fourteen dozen). However, eight pipes out of every gross were set aside to recompense workers who accidentally broke pipes.

When the pipes reached the desired consistency they were further trimmed, and for this operation the wire was again inserted so that the pipe could be held without its bending. All this trimming was done by women. The instrument used first was a knife (FIG 17,n), which was used to trim the bowl. On the back of its blade was a finely serrated edge which was used to make the denticulation round the rim of the bowl. A semi-circular notch in the blade near the handle was used to trim the stem - this notch did not have a sharpened edge. A hooked wire on the other end of the handle was to remove the dottle from the bowl where the wire had pushed the clay through.

The excess clay of the bowl mouth was cut off and the edges trimmed with a button (FIG 17,p) similar to that used by the French except that it was much flatter, rather like a draughts counter. (One would have thought this more difficult to manipulate than the French button.) The body of the bowl was polished with an implement shaped rather like a miniature sickle with its iron blade flattened and smoothed on the inside of the curve (FIG 18,r). After this process the denticulation was applied and the dottle removed; then the stem was trimmed with the semi-circular notch in the knife already noted, and polished with a small iron bar on one face of which were three differently-sized grooves to work the various thickness of the stem (FIG 18,s). The maker's name, that of the city of Gouda, and a decorative denticulation were put on the stem with a handled blade engraved with the names and having one edge serrated with the denticulation (FIG 18,t). The maker's mark was then placed on the base of the heel with a stamp (FIG 18,u) (if the coat of arms of Gouda was also put on the side of the heel, as it was for certain classes of pipe, this mark had already been imparted by the mould).

The wire was then withdrawn and the pipes stacked and dried on trays (FIG 17,q) until they were no longer supple - in summer they were dried in the sun, in winter in rooms heated by stoves, care being taken with this process as the pipes warped if dried too quickly.

Following this the pipes were polished once again, with the sickle-like instrument referred to above and with a well-polished pebble, often an agate or flint, shaped into a cone and attached to a wooden handle by a copper ferrule (FIG 18,v). The women were paid two to three sols a gross for this work.

The manner in which the Dutch fired their pipes again indicates the care with which they made their products. The saggars into which the pipes were placed were circular in cross-section and in the form of an inverted truncated cone, being one ft wide across the mouth and nine ins across the base, and were two ft deep (FIG 18,w). The saggar stood on small feet, and took a conical cap. Into the saggar was placed a hollow clay tube two or three ins in diameter with a flared base and called as a result a trompette (the word is spelt the same in French and Dutch). The top part of this "trumpet" had vertical grooves, and farther down the tube were cut vertical slits (FIG 18,y). The pipes were placed bowl-downwards in the saggar with the stems resting in the grooves at the top of the trumpet, and the saggar was then filled until the topmost stems were over a foot above the top of the trumpet and the rim of the saggar (FIG 18,x). Finely-ground fired pipeclay (gruys - modern Dutch gruis, grit) passed through a fine sieve was then poured into the trumpet. This passed through the slits and filled the spaces among the stacked pipes, acting as a support and preventing the pipes from warping during firing. The conical cap was then placed on the saggar and fixed with a clay strapping. The whole saggar was then plastered with this clay and put in the kiln (FIG 18,dd-gg); covering the saggar in this manner enabled one to reuse it four or five times. (A depiction of a saggar on a C19 maker's signboard (Helbers and Goedewaagen 1942: pl XI upper) shows what appears to be a slightly different version, the sides of the pot curving out to the wider top which has vertical sides, and the cap having a conical top but vertical sides which fit over the saggar top - this would be a logical improvement to make over the shape illustrated by Duhamel du Monceau as the cap would be less liable to slip off and break the pipestems.)

The production of clay pipes at Gouda is depicted in a series of engravings, all clearly based on each other or on a lost prototype, illustrated by Helbers and Goedewaagen (1942: pl XV, pl XVIII btm, p.90 Fig 49, p.129 Fig 95 and p.161 Fig 143). The earliest depictions are two of 1735, one a silver mortuary plaque (pl XV) and the other a woodcut (p.129). A silver tobacco-box of 1827 shows the same scene (pl XVIII, btm), and it is again recorded - this time with two of the workers in reversed positions - in an undated woodcut (p.90).

The scene depicted (FIG 19; the 1735 woodcut) shows five workers each performing a certain part of the manufacturing process. Behind a long table stand two men, the one on the left apparently in the act of lifting a strip of beaten clay (cf FIG 12,o) and the one on the right in the process of wiring the pipe - the tray used to hold the pipe during this operation is the curved object directly below the man's left hand. (In the undated woodcut illustrated on p.90 the position of these two men is reversed.) At the extreme left, seated, a man is making the rolls on one end of the table - the prepared clay appears to be in small lumps in a wooden tub beside him on the floor and the finished rolls appear to be placed in rectangular trays in simple parallel lines. Similar trayloads lie in front of the man wiring the pipes. To this man's left, hanging on the wall, is a large, probably leather, bottle - if this holds the oil for lubricating the wire and mould, as seems likely, then the undated woodcut noted above with this worker's position reversed vis-a-vis the person beating the clay must be an inaccurate copy, for it depicts this bottle in the same position as do the other illustrations and thus on the opposite side of the room from the moulder who would be using the oil. The mortuary plaque shows no bottle at all. No mould is shown in any of the illustrations. A small table is set against the front of the long table at the right of the picture, at right angles, and here two women are depicted finishing the pipes. The woman on the right is trimming the bowl of a pipe with what appears to be an ordinary knife blade, the woman on her right is holding a pipe in both hands presumably polishing it with a cloth. All depictions except the 1735 woodcut show trays of presumably finished pipes on the floor; the 1735 silver engraving and the undated woodcut depict two objects on the floor in front of the table, one a rectangular box and the other a small pot-like object, but it is not known what these were nor whether they were associated with the manufacture of pipes. All illustrations except the 1735 silver engraving depict a dog standing in the centre foreground, a homely touch possibly deliberately omitted from the silver funerary plaque; the same three illustrations also depict, behind the man making the rolls, a large barrel in which the ordinary-quality fired pipes were carried to be sold (best-quality pipes were carried in much smaller wicker baskets (Helbers and Goedewaagen 1942: 17, cf p.91 and pl XVI[6]).) A barrel and a basket of pipes were attached to two poles and carried by two men in the manner of a sedan chair; harnesses were attached to the ends of the poles to slip over the shoulders to make carrying easier (FIG 17; illustration, essentially the same as Helbers and Goedewaagen 1942: pl XVI, from Terstraten [1968]: 18).

Savary des Bruslons in his Dictionnaire universel..., where the entry on pipes is probably basically early C18 in date, indicates that Gouda pipes were packed with straw or buckwheat husks in fir chests ranging in capacity from 4 to 24 gross, the 4-gross size being said to give fewer breakages (Savary des Bruslons 1759-65 ed: IV, cols 199-200). Presumably this is referring to their method of shipment to non-local customers and for export.

According to Duhamel du Monceau's source (1771: 7) Gouda pipemakers obtained their clays from the Liège area - which must mean Andenne - and the Cologne region. As noted in Section IX below, the cliffs along the Meuse for the ca.25 miles upstream from Liège are one continuous series of clay mines, and the Cologne area had important clay deposits which were being exploited at least from medieval times for the stonewares of that region. Duhamel du Monceau also quotes, but appears to doubt (cf remarks on his preceding page), another source indicating that clay from the Antwerp area was very important to Gouda manufacturers (this may be the Roosendaal clay noted in 1644 (Douwes 1964: 365; see also Section IX below), and as noted in 3: III there is apparently a pipemaker still (1969) working at Schoten ca.4-1/2 miles NE of Antwerp).

Duhamel du Monceau (loc. cit.) notes there were merchants in Gouda who supplied the pipemakers with clay, and ca.1783 a Charles Wouters, brother of an Andenne faience-maker, lived in Gouda and acted as an agent for Andenne clay. At that time Gouda and Delft delftware (faience) factories used large amounts of Andenne clay and at the beginning of the C19 the Gouda pipe firms of Stomman and Prince used enormous quantities of Andenne clay (Javaux 1935: 4 and n.3), and according to Javaux the Dutch were still using Andenne clays when he was writing.

Brongniart (1854 ed: II, 180), summarizing Duhamel du Monceau's remarks on the sources of clays for various pipemaking centres and apparently adding some information of his own, says the Dutch used clays from Devres in NE France, Hautrage in southern Belgium, Andenne, and Vallendar near Coblenz. This last suggests that the Dutch were using Westerwald clays.

The unpublished records of the Gouda pipemakers' guild rediscovered by this writer indicate that in 1789 Gouda clay came from "the Namur district" not, as one might have supposed, directly down the Meuse, but by road to Louvain (E of Brussels and ca.30 miles from Andenne) and then by water through Brabant to the Scheldt and presumably through Antwerp. (Curiously, the trade-pattern of pottery made at Andenne and nearby centres between the end of the C11 and the second half of the C14 as evidenced by finds indicate the same route to the Schelde and a marked lack of material along the lower Meuse (Borremans and Warginaire 1966: 80 fig 34).)

The same account - one of a series in the guild records - also mentions clay from the Electorate of Trier (which included part of the Westerwald - see 3: III) and acknowledges it is used at Gouda. However, the Trier clay used by Gouda pipemakers was not obtained directly from the Electorate but from Cologne merchants. (The question of Trier clay, called in the Gouda guild records "Mogendorfen" clay - presumably from Mogendorf, ca.6 miles NE of Höhr-Grenzhausen - had been raised because the Elector, concerned at high Dutch taxes imposed on Höhr pipes in 1788, was threatening to prevent Dutch pipemakers obtaining Trier clay: the Gouda view was that as they obtained the clay only through middlemen the Elector could not prevent them obtaining the clay without banning its export entirely and that in any case it was of poor quality and little of it was used, and it could be done without. The outcome of this argument is not given, but the guild recommended standing firm, and as some problems are noted at Gouda in 1797 arising from a lack of Rhine clay and much later - in 1818 - it is recorded (Pholien 1906: 144-5) that a pipemaker at Andernach near Coblenz moved to Chokier near Liège in Belgium because of tariffs keeping his pipes out of The Netherlands it seems likely the Dutch taxes were continued.) The guild records also note, however, that in 1788 they had no Andenne clay and that in 1790 "Brabant" clay was scarce. Presumably this latter refers to the Andenne clay which was being shipped through Brabant (see above) and not to clays dug in that province - the context indicates this clay was vital to Gouda production, which suggests Gouda pipemakers had been over-hasty in dismissing Westerwald clay as of no importance.

At present the Van der Want firm get their clay from "the Liège area" though, because it is obtained through middlemen, they do not know the exact source. As noted in 2: IX there is considerable confusion about Andenne clay, for the only surviving Andenne pipemaker (Section III below) says he can no longer obtain suitable Andenne clay and now gets his from Germany (probably the Westerwald, though again the actual source is unknown.)

In unpublished records of the pipemakers' guild of Gouda there is an interesting account dated 1760 of an action by the city potters' guild against the pipemakers. The potters fired, but did not make, the pipemakers' saggars, and successfully petitioned for higher remuneration because the pipemakers "are forced to put sand and dust [from ground-up pipeclay] in their saggars because they must make the pipes longer and straighter" which made the saggars so heavy that they could not be handled by two men and increased the amount of peat needed to fire the saggars from 60 to 100 or 110 barrels. (Prior to 1747 apparently the pipemakers had to have their pipes fired by the potters, but after that date this appears to have been optional.) It is clear from the petition and the reply by the pipemakers, who acknowledge they are using sand and ground-up pipeclay, that these saggars were used only for firing the long pipes.

This reference, with its interesting example of trade union-like demarcation agreements about saggar-making and -firing, is presumably to the ground-up fired pipeclay (gruys) noted 11 years later by Duhamel du Monceau as being put into the saggars through a trompette to hold the pipes and help prevent distortion during firing. If so, it suggests this use of gruys was only being introduced ca.1760, the date of the complaint.

Duhamel du Monceau's informant noted that the clay used for the saggars was a heavy clay from Friesland, on the NE side of the Zuider Zee (now the IJsselmeer). The clay thus had to be brought at least 80 miles - no doubt by water - to Gouda.

According to Duhamel du Monceau's informant, all the Gouda kilns were built on the same principle. This was a very sophisticated version, beehive-shaped, of the large kilns used in northern France. Its major difference lay in its series of draft openings, both in the roof and beneath the kiln. The saggars were placed in the chamber and other saggars placed on top of them until the kiln was filled: the entrance was then bricked up and barred (the kiln itself had similar iron bands) and the fires started.

The Gouda kilns were fired with peat, starting at a low temperature and gradually increasing it, for a period of 50 or 60 hrs. Eventually, Duhamel du Monceau (or rather his correspondent) says, the entire kiln became red hot, even becoming transparent round the door. If the kiln did indeed become red-hot it must have had quite thin walls - an incandescent furnace wall does give the impression of transparency, but in reality there is no transparency (Lunny in litt. 18 June 1968). The kiln in question was built of a local heavy clay from the banks of the Hollandse IJssel river which flows through Gouda and its bricks were pointed not with mortar but with the same clay - the kiln described by Duhamel du Monceau's informant was said to have been in use for seven years. No temperatures are given - Brongers (1964b: 40), perhaps talking of a later period, says the pipes were fired for 24 hrs and to a temperature of 1,000°C. Lunny (in litt. 18 June 1968) says that temperatures well in excess of 1,500°C have been reached with peat by using preheated combustion air, but that otherwise it would not be able to obtain temperatures much over 1,000°C. It is likely, therefore, that the remarks about red-hot kiln walls are an exaggeration.

The secret of the firing process lay, according to the Gouda makers, in the use of peat, as wood would have heated the kiln too suddenly and caused shattering of the pipes - for this reason Friesland peat was preferred to local Holland peat because it burnt less quickly. When it was judged that the pipes were sufficiently fired, the furnace was allowed to go out and the kiln to cool.

To give them their varnished appearance, which was the hallmark of Dutch pipes and which no imitators were able to do so well, the pipes, while still warm, were dipped in a prepared mixture and rubbed with a piece of flannel. The composition of the mixture was a secret, but it was said that a certain quantity of Spanish soap and white wax was put in boiling water and the mixture allowed to cool for half an hour. When cold, it was poured into a tub and the pipes dipped in it.

The most common Gouda pipes were those with straight stems about 18 pouces long; they were sold for two florins or 40 Dutch sols a gross. Those with stems 28 or 30 pouces long sold for four florins. Each gross included one pipe called by the Dutch the newly-weds' pipe - this was a pipe with elaborate decoration in relief.

The insistence on using peat - and a certain kind of peat - for firing the kilns seems likely to be a trade tradition, based originally on the lack of coal in The Netherlands and the scarcity of wood. The potters' guild in Gouda, in refuting the pipemakers' complaints that the use of the wrong type of peat was ruining their pipes, claimed that the type of peat used made no difference to the product provided it was correctly used; this, however, begs the question to some extent because the pipemakers had obviously evolved a very rigid manufacturing tradition and while no doubt other fuels could have been equally successfully used they would have necessitated the modification of the pipemakers' mystery. As other countries used wood or coal successfully, the Dutch insistence on peat must be a reflection of their desire not to change their traditional methods evolved over the preceding century and a half. To take only one point: their firing took 50 or 60 hrs, something like seven times the most frequently-recorded times in other centres and more than double the next longest time recorded. Presumably this was because peat was used at Gouda whereas wood or coal was used in the other centres. Clearly, any change in fuel would have necessitated a complete and costly series of experiments to find the new optimum firing period and the amount of fuel needed.

The modern commercial use of peat has been pioneered by the Irish Peat Board, to whose Chief Fuel Technologist, F. Lunny, I am indebted for considerable help. It appears that peat has advantages for kiln firing compared to other fuels. First, it produces an extremely long flame and at the same time has a lower firebed temperature than other fuels: these points reduce the danger of overfiring material near the fuel and give a more even distribution of heat. Secondly, peat has a low sulphur content, which removes the danger of the wares blooming in the drying stage which otherwise has to be obviated by drying with preheated clean air (Lunny in litt. 4 June 1968).

Disadvantages are its calorific value, which is about half that of steam coal, and its density, also about half that of coal, though the modern use of mechanical stokers for peat-fired furnaces has resulted in almost twice the rate of heat-output from peat compared to coal (Lunny n.d.[1]; Lunny n.d.[2]). When a peat-fired boiler was installed at W. and R. Jacob's biscuit factory in Dublin it was found that the different characteristics of peat as opposed to fuel oil resulted in a combustion-chamber temperature increase from ca.650°C to ca.870°C - the reason for this was the comparatively short flame given by the oil (Anonymous 1961: 5th page).

Two characteristics of peat which could certainly have affected an attempt to change to another fuel are the low temperature at which self-supporting oxidation begins, and the high temperature needed to ignite its volatiles. The former is between 150°C and 210°C, probably the lowest of all commercial fuels; the latter is difficult to estimate and varies according to the amount of moisture in the peat, but is not less than 700°C. It is thus possible to burn peat entirely to ash without releasing any of the heat in the volatiles (Lunny n.d.[1]: 4-5). Another characteristic of peat, allied to these, is that it will burn with a very small supply of air: this might make it easier to use in a primitive kiln, but because of its long flame it would be desirable from the point of efficiency to have a good supply of air and sophisticated flues (Lunny *in litt*. 4 and 18 June 1968).

There is always an intense craft conservatism, in many ways a real safeguard when the science and thus the significance or non-significance of each part of the process is not understood, which decrees that the prescribed actions shall be followed. Talking of the wheelwright's trade at Farnham in Surrey as late as 1884, Sturt noted that the workers "possibly (and properly) exaggerated the respect for good workmanship and material" and that in the workman was "stored all the local lore of what good wheelwright's work should be like" (Sturt 1923: 53, 54, 1963 ed). Asserting the superiority of their product in 1785, at a time when the Gouda industry had seriously declined largely because of hostile foreign tariffs (see: II), Gouda pipemakers maintained that nowhere could a factory be moved and still produce pipes of Gouda quality because nowhere could a factory be moved and still produce pipes of Gouda quality because nowhere outside Gouda could "suitable air, material, kilns, or fuels" be found (quoted from unpublished Gouda guild records) - clearly, Gouda pipes, like Scotch whisky, could not be successfully copied, the very air being cited as helping to produce superior pipes. In 1818 Gouda pipemakers claimed that smokers could break three other pipes to one Gouda pipe and that Gouda pipes could be cleaned by refiring three or four times as often as others (unpublished Gouda guild records).

If, as Gouda pipemakers claimed, the use of other fuels would have resulted in too sharp a rise in temperature and a shattering of pipes (which would agree with their use of a slow-burning fuel, and the length of time they took) it is difficult to believe that they could not have modified their methods - for example, increased the time the moulded pipes were sun- or air-dried ("stoving" as it is called in Britain) - to prevent shattering. Indeed, the same unpublished documents note in 1776 (only 16 years later) and on into the 1790s that the pipemakers successfully petitioned for a lessening in the duties they had to pay on the coal they used, which indicates by that time at least the use of coal must have been known.

Brongniart (1854 ed: II, 185), noting that Duhamel du Monceau had mentioned in 1771 peat-firing and its taking 50 to 60 hrs, observed that when he visited Gouda in 1835 coal was being used. He gives no time for firing with coal, but commenting with surprise on the figures given for peat-firing, said that wood-firing took between 6-7 hrs and 14-16 depending on the size of the kiln. He noted that the Gouda makers held that wood fired the pipes too quickly and caused many breakages. The guild documents, in emphasizing in 1785 that Friesland peat had always been used for firing pipes, also complain that the potters who fired the pipermakers' saggars of pipes were using a black peat (probably the Holland peat referred to in the 1760 reference earlier) which was ruining their pipes because it produced far too much heat, that the heat was unevenly distributed, and that the peat was fit only to be used in brick kilns which needed, and could take, higher temperatures. (Parenthetically, the idea that Gouda air helped make Gouda pipes the best in the world should not be dismissed out of hand as absurd - local climate may have assisted in keeping the clay at an optimum dampness for good moulding just as it is said to have helped the Lancashire cotton industry by making cotton damp enough to be spun without breaking.)

However, the firing process is crucial to the whole pipemaking mystery. A revealing sidelight on the difficulties of achieving a satisfactory product occurs in Exeter in 1654, when on 12 August an Exeter pipemaker, Edward Tribble, deposed at the City Sessions that Diana Cross, suspected of being a witch, "called for fire at his house, which he gave her, and for one month afterwards he could not make his pipes to his satisfaction", they being either over- or under done. Further, it was averred, she had cast her evil eye on a boy in Tribble's employ - doubtless an apprentice - and "affirmed" he would never be well, after which the boy "grew into a distracted condition, and was much consumed and pyned away in body" (Rippon 1917: 115; Jewitt 1878: II, 457).[8]

By the middle of the next century witchcraft was no longer used to explain the difficulties of obtaining good ceramic bodies, but workers still had their problems. When the Delftfield pottery in Glasgow was started in 1748 it ran into a whole series of difficulties before producing its first satisfactory products. The founders had been assured that local clay from the lands of one of their number was suitable for the production of tin-glazed earthenware, but this proved to be untrue. Clay was then imported from Carrickfergus, Northern Ireland, but the first biscuit firing was destroyed when the saggars collapsed and blocked the flues (the wood initially used as fuel burned too rapidly and coal, the use of which at this time for firing pottery seems to have been almost unknown, was said to have been added). The second biscuit firing was successful, but the glaze firing was unsuccessful. This was initially blamed on the soft grinding-stones used to prepare the glaze depositing refractories in the mix, but subsequent investigation proved that the proportions of the ingredients for the mix had been wrong (Fleming 1923: 82-5; Archer 1966: 16-17). These and other problems there (cf Archer 1971: 244-6) indicate sucessful production was still founded on a trial-and-error basis. Indeed, Rhodes observes that even today "So many variables are involved in the construction and operation of any kiln that experience, trial and error, and experimentation, rather than a fixed design, must be relied upon for success" - kilns seem to mellow with age, so that after a dozen or more firings most problems will probably disappear (Rhodes 1969: viii, 140). Examples of this trial-and-error approach, together with the use of inherited tradition, by small traditional potteries in this century are recounted by Fishley Holland of Clevedon (Holland 1958: passim).

The granting of the second charter to the Westminster pipemakers' guild in 1634 was to four individuals some of whom had discovered how to fire pipes with "seacole or pittcole" - that is, coal in its modern sense; until the C17 "coal" meant charcoal - instead of wood and who in return for the monopoly in pipemaking were to teach guild members how to fire their pipes with coal. On the other hand, the first charter - that of 1619, revoked in 1621 - had specifically said that members could "burne and bake with all or any sort of fewell fire or fires whatsoever" their pipes (cf Robinson and Spence 1937: 202; Oswald 1960a: 42 n.5; for details of the two charters see 3: I). The permission given in 1619 to use any sort of fuel must represent a considerable privilege, for only four years previously the glass industry of the Weald had been extinguished by a prohibition on their use of wood as a fuel (G.H. Kenyon 1967: 49) and as early as 1565 the Lake District iron bloomeries had been suppressed for similar reasons (Marshall and Davies-Shiel 1969: 161).

The widespread depredation of English woodland caused by ever-increasing quantities of wood needed as fuel in pottery, glass, and metal production was a matter of increasing concern from the later C16 onwards (cf Knowles 1927: 309; G.H. Kenyon 1967: 48). The cost of wood rose extremely rapidly from ca.1540 - a load which had cost 3s4d in 1536 in Rutlandshire cost 25s in 1586 (Nef 1932: I, 158). In 1697 it was decreed that at Bury St Edmunds "no brewers, dyers or others using much fuel in their trades" were "to burn any wood or charcoal, but only seacoal, sedge, straw, or other such things" because of lack of wood and charcoal (Willan 1938: 62, 1967 ed). It is therefore not surprising that the promised use of coal appears to have been the chief reason for granting the second charter. As late as 1663 some London-area pipemakers appear to have still been using wood, for in that year the Westminster guild received certain favours in return for again promising to use only coal for firing pipes. The 1671 inventory of a deceased Spalding pipemaker, John Fox (P.K. Wells 1972: 14), included 5,000 billets of firewood, three loads of wood, and 2,000 turves, presumably fuel for his kiln, suggesting - interestingly, in view of the strong beliefs held by Gouda pipemakers (noted above) as to the correct type of fuel they required - that in fact no insurmountable difficulties presented themselves when different fuels were used. This impression is reinforced by another deceased Lincolnshire pipemaker's inventory, this time of a Boston maker, James Harford, and dated 1676 which included wood and "coles" (P.K. Wells 1972: 13) and would again suggest - provided "coles" here refers to coal in the modern sense, which is quite possible as Boston would have been able to take advantage of the Newcastle-London coal-trade - that different fuels could be used without incurring major problems. Coal appears to have been used by a Spalding maker in the following century, for the inventory of Isaac Bilby's assets, taken in 1728, includes a "parcell of coals" valued at £3 (abstract of inventory seen November 1973; I am extremely grateful to Peter Wells for showing me this material). The inventory of Matthew Heblethwight of Lincoln, compiled 1729/30, suggests wood may have continued to be used as late as that time, however, for in a fairly detailed listing the only possible fuel which appears is "Wood in ye yard", valued at 10s (P.K. Wells files). Certainly, the inventory of a deceased Great Yarmouth maker, William Harpley, dated 1674/5, noted £2 10 0-worth of "Billett", presumably firewood; however, a similar inventory of 1691/2, also from Norfolk, for a deceased Downham Market maker, William Case, noted "a parcell of turfs" valued at 6s in his stable, which was presumably fuel for his kiln (Oswald *in litt.* 11 October 1972; I am extremely grateful to H. Oak-Rhind for permission to quote these Norfolk extracts, the Great Yarmouth inventory coming from the Norwich Archdeaconry Court Inventories and the Downham Market inventory from the Norwich Consistory Court Inventories).

In 1610 a patent was granted for a method of using coal in various industrial processes, including metal- and glass-working; and another was granted the following year specifically concerning glass-making (*VCH Surrey* II, 299-300). In 1615, simultaneously with the prohibition on using wood as a fuel, all previous patents for glass-making were revoked and a new one issued for its manufacture with coal as the fuel. One of the patentees was credited with the introduction of covering the crucibles, which enabled coal to be successfully used (Knowles 1927: 345). Nef (1932: I, 218-9) claims that the closing of the crucibles to prevent contamination from gases was the most important factor in adapting to coal; but control of the firing itself must have been just as important. Nef himself (1932: I, 218) quotes from a source of 1612 which says that "by a wind furnace" glass could now be made as well by coal as by wood-firing. The "wind furnace" must refer to the regulation of the draught for the fire, and indicates that the chief technical difficulty in changing from wood to coal - that of controlling the fire - had been mastered.

The conversions necessary for this were underground flues, a grate to which the flues connected, and ledges on which the crucibles were placed (G.H. Kenyon 1967: 48, 216 figs Y and Z, 216 and 217). Another problem which had to be mastered was that coal has an appreciably higher calorific value than wood - good coal has a value of ca.12,000 BTU per lb as opposed to a value for wood (though as noted below, there is considerable variation among different types of wood) of ca.8,000 BTU per lb (Cardew 1969: 176). Moreover, when firing ceramics with wood or other vegetable fuel it is necessary to have a combustion area where the incoming air can reach a uniform temperature before entering the firing-chamber, as otherwise the air is able to rush through the loosely-packed fuel and into the kiln as a mixture of long flames and relatively cool draughts, which could shatter the wares waiting to be fired; with coal or peat, however, the air passes slowly through a mass of glowing ashes which evenly heats it without the necessity of a combustion area (Brears 1971: 137-8). Further, wood has to be fed in at the proper rate: if not enough is added the temperature inside the kiln may drop precipitously, while if too much is put on the fire may be temporarily smothered, again causing a loss of heat (Rhodes 1969: 68). On the other hand, a great merit of wood is its long flame, and in fact wood, though bulky to store and involving more labour in its use than other fuels, is an excellent fuel for high-temperature kilns, being widely used in Europe well into this century for firing hard porcelain to temperatures up to and beyond 1,400°C (Cardew 1969: 176).

Just as the Gouda pipemakers preferred a certain type of peat, so medieval glass-makers preferred beechwood to other kinds of wood, probably because it yielded a clearer and hotter fire than other woods - in Classical times glassworkers favoured tamarisk wood (Knowles 1927: 243). One C12 writer maintained that beechwood "thoroughly dried in smoke" should be used by glassworkers (Knowles loc. cit.): green wood would have caused smoke and given a less hot flame (G.H. Kenyon 1967: 45; Rhodes 1969: 66 and 88), and Hayes (1970: 30) quotes Agricola in his De Re Metallica of 1556 observing that "Dry wood was vital because working close to a furnace with no chimney would be impossible with the smoke of green wood". At the glasshouse-site excavated by Hayes, in Rosedale in Yorkshire, beechwood was apparently not available and oak was probably used, oak being the second-best choice (opinion of D. Hogan of Pilkington Glass Museum quoted in Hayes loc. cit.). Observations (quoted in Knowles 1927: 345) indicate that during a year's operation a glass-house consumed almost double the amount in weight of dry beechwood compared to the amount of coal that would have been used but that the heating effect of the wood was over half as much again compared to the coal. Beechwood was used in France by glassmakers from medieval times (G.H. Kenyon 1967: 46) until the C19 (Knowles 1927: 343 and 345) but though glass was being made in north France in medieval times the pipemakers in this area were using deal in Duhamel du Monceau's time, as already noted, and not beechwood. A reference in the Canterbury Tales claims beechwood was a superior fuel in alchemy (Knowles loc. cit.); and it is still used in the Westerwald pipe industry in Germany (Section VI below) - where it has to be imported - for the final hour or so of the firing. However, the references to deal, which is softwood, being used by pipemakers in north France and to tamarisk wood, also a softwood, being preferred by Classical glassmakers is interesting, because although there is a marked difference between the total heat released by two comparable amounts of softwood and hardwood - a cord of air-dried aspen, a softwood, produces 12,300,000 BTUs while a cord of air-dried hickory, a hardwood, produces virtually double that amount, 24,200,000 BTUs - the open-grained structure of softwoods is preferred for kiln firing because the heat is released at a faster rate, an important factor in raising the temperature of a kiln. Thus pine and fir (i.e. deal), hemlock, or spruce make excellent kiln fuel (Rhodes 1969: 61, 68 fig 67).

Independent of the fuel used, there is the problem of heat loss. Norton (1952: 136, 138 fig 16-2; the figures are repeated in Rhodes 1969: 154, but misleadingly) indicates that in a typical periodic kiln (i.e. one used for single firings, such as the ones discussed here, as opposed to continuous-chamber kilns or tunnel kilns) for firing refractory products only 20% of the heat is used for firing the ware. All the heat is, of course, lost eventually, directly or indirectly, but the various sources of loss run from 6% for incomplete combustion of the fuel up to 36% for the flue gases. For the more primitive kilns, such as must have been used by most pipemakers, at any rate prior to the C19, the amount of heat used in heating the pipes was probably appreciably less than even 20 per cent.

From all this, therefore, it is clear that the firing process was the most vital part of the whole operation, and it is quite understandable that once a proved pattern had been evolved round a certain type of fuel, makers would be reluctant to experiment with other fuels, particularly as they could only do so by trial and error.

As clay pipes are still manufactured in Gouda, it is possible to make a comparison between the modern production methods and those described in such detail by Duhamel du Monceau. In April 1969 the writer visited the Zenith Plateelbakkerij en Pijpenfabriek owned by the Van der Want family who have made pipes since 1749, and found the present techniques quite similar to those described two centuries earlier (the former have been more briefly described in I. Walker 1971b). The present two workers[9] - twins, then 18 years old - had been taught by their grandfather who was 91 in 1968 and had made pipes for the firm for 60 years, and another former employee who had made pipes for 40 years. The present method is thus the better part of a century old at least.

The clay used, whether white- or red-firing, comes from the Liège area of Belgium. (Unfortunately, it was not possible to find precisely where the clay was mined, and as noted subsequently in the section dealing with manufacture at Andenne and that on the clays used in pipemaking, there is considerable confusion regarding Andenne clay.) Alternate layers of scrables or schrobbles (spew) and fresh clay are laid down to form the soken (pill), which is then mixed by a pug-mill. This clay is delivered to the pipemaker in blocks, and from this a muis (nip - literally, mouse; also, the heel of the hand) of the correct amount for the size of the rol (roll) is taken. In the attenuated version of the industry which now exists, all the work from the rolling to the trimming is done by the one person; formerly the person making the rolls was known as a rolder (the equivalent English term would presumably be roller, but as noted previously this term has probably been lost, for it does not appear to be known in the British industry).

The roll is started with one hand, then both are used (FIG 21) - this differs from the present British method, (Section VII below), where each hand makes a roll simultaneously. This distinctive technique is depicted in two engravings of 1735 (Helbers and Goedewaagen 1942: pl XV and p.129 fig 95, cf also p.90 fig 49, p.161 fig 143, and pl XVIII btm; p. 129 fig 95=FIG 19 above - in each case the rolder is on th extreme left) as noted earlier, and must thus be at least two and a half centuries old. The rolls are made on a bench called a rollenbank and placed three deep, 18 together, in a bosje rollen (literally, roll-bunch) on a paddle-shaped rollenplank (variously called a "bench", a "dozening board", or a "bunch board" in Britain, though these are simple rectangular boards and not paddle-shaped). The three rows of rolls comprise seven, six, and five rolls respectively (FIG 22); the paddle end of the board holds the heads of the rolls, which take up more room than do the narrow stems (FIG 21). The stem ends are cut off with a mesje (literally, a small knife or blade) or nipped off with the fingers, and the stems set aside to dry to the right consistency for the next stage of the process.

This stage is the wiring and moulding. The roll is laid in a small turnable trough on a stand called a *gootje* (literally, little gutter) (FIGS 23,24). The end of the *weijer* (wire) (FIG 25), which is blunted, is dipped in a dish of oil and the roll pulled over it to a point just short of the head of the roll. The head of the roll is then bent up and its end broken off. The bipartite bronze *vorm* (mould) (FIGS 25,26) is then cleaned of pieces of clay left from the previous moulding and oiled from an oily rag (not from the dish of oil, which is used only for the wire and the *stopper*) with the fingers. The wired roll is then placed in the mould (FIG 27), which is closed and placed in the *schroef* (chest - literally, screw). A wad of paper cushions the mould in the press - this is called a "slot" in English, though no special Dutch term is known for it. The chest is closed by a handle, which is held tight with the knee. Simultaneously, the thumb is pressed into the mouth of the mould (FIG 28). The *stopper* (same word in English) (FIGS 23,25) is then dipped in the dish of oil and rammed into the muld mouth by hand with a twisting motion, several times, the excess clay being forced out the mouth (FIG 29). (This part of the process is simpler than that described by Duhamel du Monceau, where an index finger was inserted into the mouth of the mould and the clay from the bottom smeared round the mould wall before the stopper was used; in all probability this change was to effect a higher output and is a concession to mass-production.) The excess clay forced out the top of the mould is called the *directie*, or *diereksie* in the local Gouda dialect (the word literally means board or management; the origin of its use in this context is uncertain).[10] This is left on until the final trimming process. Dutch moulds, unlike British ones, have no slot near the top of the bowl into which a knife is pushed to remove the excess clay - the Dutch mould simply carries on an inch or so beyond the top of the bowl outlined in the mould.

Following the use of the stopper, the wire is pushed home to complete the bore, this being checked by looking inside the newly-formed bowl. The piece of clay pushed into the bowl by the wire and known in Britain as the "dottle" or "pep" is not removed, nor is any special term known for it. (This is a departure from Duhamel du Monceau's description, again probably a concession to higher output.) The mould is then removed from the chest and the pipe from the mould, a finger often being put in the bowl to assist in this latter (FIG 30).

When the industry was larger and there were workers concentrating on particular parts of the manufacturing process, the person doing the moulding - the "moulder" in English - was called the *kaster*. However, as Duhamel du Monceau also indicates, the *kaster* did part of the trimming as well, for part of this process is done immediately the pipe is taken from the mould, whereas in Britain the pipe is set aside to dry to a certain consistency before any trimming. At present the gross excess is taken off the stem with the fingers; the *schenkertje* (literally, little shanker) (FIG 31), an implement which has a blade set in a wooden handle and a wire with a semi-circular bend towards its end fitted into one end of the handle, is used to trim off the rest of the excess stem clay. In this particular operation only the curved wire of the *schenkertje* is used (FIG 32). Following this the fingers are again used, this time to smooth the stem. The blade of the *schenkertje* is then used to cut off the end of the stem. All this time the wire is used to hold the pipe - the *schenkertje* blade cuts the stem round the wire. The wire is now removed and the pipes stacked in trays to dry to the correct consistency for further trimming. (For very long pipes a schenker (shanker) was used to trim the stem. This differs from the schenkertje in being much larger and in not having a blade set in the handle. Why a tool differing in these respects from the standard piece of equipment should have been reserved for very long pipes is not known, and in fact it is no longer used.)

When the pipes are leather-hard the directie is removed with an ordinary paring-knife, the stem being rested on the shoulder during this process (FIG 33). Formerly, this was done by women known as tremmers or tremsters (trimmers). The pipe is then held vertically by the bowl and the mould-lines on the bowl pared off with the same knife (FIG 34) - formerly the bowl was smoothed by a smoier (smoother, though the English implement is simpler than the Dutch) (FIG 26), a tool similar to a schenker but with a sickle-shaped piece of flat-edged metal, but this is not now used. Finally, the rim of the bowl is smoothed with the botter (button) (FIGS 25,26) which is fitted over the bowl and turned (FIG 35).

(A comparison between this account of the trimming and that of Duhamel du Monceau again shows a streamlining of the process in the interests of mass-production. The initial trimming by the kaster with the schenkertje remains unaltered, but the work of the tremster has been considerably curtailed. Instead of the specialized knife with the semi-circular notch on the blade to trim the stem, the denticulation on the back of the blade to mark the bowl rim, and the hook on the other end of the handle to remove the pep or dottle, an ordinary kitchen paring-knife is used - the dottle, as noted previously, is no longer removed, and the denticulation no longer applied. The trimming and smoothing formerly effected to the stem by the notched blade of the knife and to the bowl by the smoier have likewise been dropped. The Van der Want factory still has the implement with which the name and place of work were marked round the stem - a small, thin, flat piece of metal with the lettering stamped on from behind to give the raised inscription necessary to impart the impressed marking - but they do not now use this, using instead a printed paper sticker with white lettering on a blue background stuck spirally round the stem at its point of balance (FIG 36). This form of marking appears to have become standard latterly among Dutch pipemakers (cf also its use in Flemish Belgium in the following section).)

The pipes are then further dried before firing. This process, known as "stoving" in English, is called drogen (to dry) or te drogen zetten (put to dry). Pipes which are to have curved stems are placed in the grooves of a curved corrugated zinc board with bowls hanging downwards alternately over each edge. The stem ends are put into metal hoops set alternately at the ends of the grooves (FIG 37). Straight-stemmed pipes are dried in grooved wooden trays - in one half of the tray the bowls are at one end, in the other half at the other end, in two staggered rows, each groove being progressively angled to the previous to accommodate the bowl (FIG 38). This ensures maximum usage of space. Pipes made of poorer clay are dried with a naald (wire - literally, needle) in their stem to prevent warping when drying.

If the pipe is to be burnished this is done with a glaaspin, a conical "pencil" of agate set in a handle; the person doing this, when it was a specialized part of the finishing, was a *glaaster*. In former times, after firing, the pipes were dipped in *zeepsop* (soap solution) on being removed from the kiln and polished with a *snollap*, this process being called *snollen*. (*Lap* in *snollap* is a cloth; the meaning of the *snol-* root is unknown. *Snollen* is a slang word for women of dubious repute and is also used, though rarely, to indicate endearment; it also occurs in the expression *in de snol* meaning mixed up or tangled up. In the southern Dutch-speaking area it is also a verb meaning to sniff or snuffle.)

(The description of these finishing techniques corresponds to that of Duhamel du Monceau; the abandoning of the polishing is yet another concession to speed and expense of production.)

A proclamation by the Gouda magistrates in 1750 forbidding the export of pipemaking equipment to other pipemaking centres lists *vormen* (moulds), *pyp-potten* (saggars), *glass-steenen* (glazing-stones, the modern *glaaspinnen*), *trompetten* ("trumpets" - the special support for the pipes in the saggars), and *gruys*. This last term literally means "grit" (modern Dutch *gruis*) and presumably refers to the finely-ground and sieved fired pipeclay poured into the saggar through the trumpet to bed down the pipes before firing.

Firing was formerly done in *pijpenpotten* (saggars - literally, pipe-pots, though the more general term for saggar, *kapsel*, is also known). These were similar to those described by Duhamel du Monceau, fireclay containers on small feet, basically cylindrical in shape but wider at the mouth than at the bottom, with a conical top. This part of the process, called "potting" in the British industry, was called *het potten* in Gouda. Nowadays, however, the pipes are laid on large open fireclay tile stacks (FIG 39) arranged in the manner of shelves one above the other and fired thus in an electric kiln to a temperature of 1,000°C. Both downdraught kilns and bottle kilns were known in the industry, the former having the same sort of baffle - known as a *scherm* (literally, screen) in Dutch and "bag" in the British industry - on the inside to prevent the direct flame from the fireboxes round the kiln hitting the saggars as have downdraught kilns used by British pipemakers.

For the rapid production of cheap pipes a machine on which the stoppers and wires (two each) are operated by levers is used (FIG 36). This type of machine is the standard method of pipe-production at Andenne and in the Westerwald, Germany; its use is described and illustrated when dealing with the Westerwald industry (see Section IV).

According to Brongers (1964b: 37-8, 29 fig a) the rolls were made by a "moulder" (the word appears in inverted commas): as Brongers's book is in English it is not easy to decide whether "moulder" is a chosen translation or *rolder* or whether it does represent a Dutch term otherwise unknown to this writer. Certainly Brongers is not confusing the term and function with that of the *kaster*. If an alternative term for *rolder* were "moulder", then one might hypothesize an early English term "moulder" for the postulated "roller" and suggest that this term had subsequently been shifted to describe and encompass the work of the person working at the mould, a hypothetical original English term "caster" being dropped.

The rest of Brongers's description (pp38-40) of the manufacturing process follows fairly closely that noted above, though his 1912 illustration (p.39 fig b) shows simple saggars instead of the distinctive ones described by Duhamel du Monceau. Firing was to 1,000°C and lasted 24 hours.

Gouda pipemakers, unlike British pipemakers, still make their own moulds when necessary. A solid version of the pipe, complete with any decoration, is modelled, and from this a plaster mould in two halves is made. Each half is the exact shape, inside and out, including pinions and sockets, that the final metal halves will be (FIG 41) (these are similar to the plaster moulds noted previously in the Musée du Tabac, Bergerac). Each of these halves is then treated as an original model, and bipartite moulds of each half are made. These secondary moulds are fitted together and the final metal pipe-mould halves are cast inside them. These final parts are then trimmed and smoothed and the mould is ready for use.

SECTION III:
METHODS USED IN BELGIUM

Culturally and linguistically, modern Belgium is divided into two, the northern half of the country where Flemish, a dialect of Dutch, is spoken, and the southern half which speaks Walloon, a French dialect.

Two accounts of pipemaking in the Flemish area are known to this writer, one dating from the last quarter of last century and based on information given by a Courtrai (Kortrijk) pipemaker, and a more detailed one describing the method of manufacture at Courtrai apparently fairly recently - as noted in 3: IV, pipemaking continued in Courtrai until 1954 when the firm moved to Kuurne ca.2 miles NE of Courtrai, where it still (1971) continues, employing three workers.

Unfortunately, while in Britain this writer was not aware that pipes were still being made at Kuurne, and so did not visit the factory. The accounts given, however, suggest production was, and no doubt still is unless machinery has been introduced as it has been at Andenne in Walloon Belgium (see below), in the traditional Continental manner. Terminology, as would be expected, basically follows the Dutch.

The description of the process dating from last century first appeared in the 15 January 1891 issue of a journal called Rond den Heerd and had been given to the correspondent by a Courtrai pipemaker about ten years previously; it was republished in an issue of Ons Heem in 1958 or 1959 (Anonymous n.d.[31]).

The source of the clay used is not stated, but it arrived at Courtrai by boat, presumably up the Lys, which is a tributary of the Scheldt. Shovelfuls of the clay were beaten with a handboom (a wooden bar - the term usually refers to, for example, the bar or spoke of a capstan) or ground in a molen (mill), and then allowed to soak. Following this preparation the clay was taken to the workshop in square blocks, from which the rolder (roller) took a poote (nip - literally, paw or leg of an animal) and rolled out the stem on a table, leaving a lump at one end of the roll for the bowl. Fifteen of these rolls made a dozen, and these were then left to dry for one to six weeks, after which they were softened in water.

The bore of the stem was then made with an ijzerdraad (wire - literally, iron wire) with a widened end, and the pipe with its wire placed in a bipartite vorm (mould). The bowl was then hollowed out with a stuiker (stopper - literally, stamper) until the stem bore was reached. The pipe was then taken from the mould and the mould-lines trimmed off with an ijzerken (literally, a small piece of iron - the "-ken" ending is a Flemish diminutive, the equivalent of the Dutch "-je" - and presumably the schenkertje of the Gouda industry (see preceding section) and the smoetter in the more recent account of the Courtrai pipemaking (see below)) and the wire removed. Following this the pipe was geschrood (from the Flemish verb schroden, more commonly schrooien - to pare, prune, finish off) the excess clay round the top of the bowl removed and the bowl and stem mould-lines smoothed. This part of the finishing - not the trimming with the ijzerken -

was called *tremmen* (to trim); and here the tradition is the same as that recorded at Gouda by Duhamel du Monceau and up to recent times, where the *kaster* (moulder) did part of the trimming, then set the pipes aside to dry to a certain consistency before the *tremmer* or *tremster* gave them their final trimming.

The next process was glazing with a smooth stone, and the pipes were then put in small boxes for further drying. Finally, when almost completely dry, they were put in *bakskens* (literally, little trays) "filled with clay", and put in the kiln for firing (this filling with clay is presumably a misunderstood reference to the former Gouda practice noted in the preceding section of bedding the pipes in the saggars with ground-up fired pipeclay; the closing sentences of this account lack clarity, no doubt because the correspondent recounting it ten years after he had been told the account was not familiar with the pipemaking process).

The more recent account of Courtrai pipemaking is rather more detailed, though essentially the same process is described; some of the terminology is different, however (Van Hoonacker 1971: 243-5).

The clay is described as having come "formerly" from the Andenne district; this suggests it no longer comes from there, but no other source is noted. On arrival it was stored in the *aardekot* (clay-shed). As at this stage it was very hard it was first ground in a *broyeur* (this is a straightforward French word, the only one recorded in either of the Flemish accounts of pipemaking, meaning a grinder or grinding-mill; the verb *broyeren*, to grind, has also come into Dutch from French), then put to soak in a vat. Following this, the clay was pressed into square blocks, put on planks in a cellar, and covered with packing-paper to stay *neers* (a term not found in dictionaries - from the context it must mean damp or pliable). After a day or two in the cellar the clay was ready for use. In order to prevent mixing, the red clay was used in the "*rode zolder*" (red attic) and the white in the "*witte zolder*" (white attic). (Following his description of the manufacturing process, Van Hoonacker lists (1971: 245-8) the pipe types appearing in a 1920 catalogue and which colours they were available in - white, red, or black. How black pipes were produced is not indicated, but undoubtedly the colour would have been obtained by firing white pipes in saggars full of sawdust as was the case at Forges-les-Eaux near Rouen in France (p.94 above) and Andenne (see below) or possibly in coal-dust as was done at Glasgow (pp144, 147 below).)

The manufacturing process was divided into five parts, the *rollen* (rolling), *kasten* (moulding), *tremmen* (trimming), *glazen* (glazing), and *bakken* (firing).

A *duffel* (again, a term not found in dictionaries, but the equivalent of the *poote* in the earlier account; the "nip" of the British industry) of clay was taken from the block and made into a *rolle* (roll) on a *rolbak* (literally, roll-tray - here the account may be confused, for the term "roll-tray" sounds as though it is more likely to mean the "roll-board" (*rollenplank*) of the Gouda industry, on which the rolls were stacked by the dozen after they had been made - the bench, dozening board, or bunch board of the British industry - than the actual bench on which the rolls were made, which was called a "roll-bench" (*rollenbank*) at Gouda: possibly the terms *rolbak* and *rollenbank* have become confused). A lump was left at one end of the roll for the bowl, and the shape of the roll varied with the type of pipe to be made. After being left to dry for two days, the roll was taken by the *kaster* (moulder) and dipped in a *dopbak* (literally, a dip-trough) of water to soften it again. An oiled iron *weier* (wire) with an expanded end to facilitate withdrawal was inserted through the stem as far as the bowl, and the wired pipe then placed in a bipartite iron *vorm* (mould) and the mould in a *schroefbank* (vice). The bowl was formed with a *stopper* (stopper) which had a heavy iron handle to provide more weight. The wire was then pushed back and forth until it reached the stopper, and following this the pipe was taken out of the mould, the wire removed, and the pipe again set aside to dry for a few days.

The rolling and moulding were done by the men, and in an eight-hour workday they could produce six gross of 180 pipes. The next operation, the trimming, was done by the women. For this operation, another *weier*, thinner than the one used by the moulder, was inserted through the stem to support the pipe. The *toppelken* (the extreme end of the stem; *toppel* is a Flemish term for the top or an extremity, *-ken* is the diminutive) was cut off and the *muts* (the excess clay at the top of the bowl forced out by the stopper, the *directie* or *diereksie* of the Gouda industry - literally, cap) removed. The rim of the bowl was then smoothed off, rounded or flat depending on the type of pipe, with an iron *bottom* (button). The mould-lines on the bowl and stem were then smoothed over with a *smoetter*, a curved piece of iron wire (a tool fulfilling the function of the British smoother, from which the word must come, but evidently here a version of the Gouda *schenkertje*). An iron stamp bearing the firm's name, De Bevere, was worn round the neck by the trimmers and used to impress the name on the stem. With the wire still in place, the pipes were put on wooden trays to further dry for three days. (Subsequently (1971: 248), Van Hoonacker also notes that in the C19 the firm's products had the mark D on the base of the heel and DE BEVERE - KORTRIJK impressed on the stem. In the C20 a paper label was stuck to the stem with "D.B.K. Vraagt het merk De Bevere, Kortrijk (België)" - D.B.K. [presum. standing for De Bevere, Kortrijk] ask for the mark De Bevere, Courtrai, Belgium - printed in white letters on a blue background, a style of labelling latterly adopted at Gouda and still used there (see preceding section). When Robrecht Laporte took over the De Bevere firm in 1950 (see 3: IV), his pipes had FABRIEK/LR/KORTRIJK (factory/LR/Courtrai) impressed on their stem, but the pipes produced at present (1971) have no mark.)

The polishing or glazing was done with two small agate rods attached to an iron tube. The two rods were held firmly in the right hand; the pipe, held in the left hand, was rotated and thus polished on all sides. This process was not used on pipes destined for shooting-galleries.

Firing was done in saggars. The kiln was lit at 4 p.m. and kept going until 10 a.m. the following day, giving a firing time of 18 hrs and producing a temperature of 1,100°F. The kiln was then allowed to cool. Coal was the fuel formerly used, but oil-firing is used now.

The manufacture of pipes at Andenne in Walloon Belgium was described earlier this century (Javaux 1935), and the methods used there were different in some ways from those used in northern France and The

Netherlands.

At Andenne, the haulier who delivered clay to the pipemakers left a sample first. This was examined to see if it had any visible impurities - iron was the most usual - and then broken into two pieces. One was stamped with the supplier's initial (and a number if he had brought more than one sample) and set on the fireplace to dry, the other was worked to see how it reacted and then tested to see how it took a polish.

If the sample was satisfactory, blocks of it were delivered and stored in a clean, dry, and well-ventilated place. When it had been dried it was broken down and put in a large maceration pit outdoors for weeks or even months (this is similar to the process Brongers says took place at Gouda, as already noted). Following this, the clay used to be worked on large panels of wood with the feet, or on a bench with an iron tool; latterly puggers were used, though an iron tool known as a *plenne* was still used for beating small quantities of clay. After being beaten, the clay was left on damp sacking for several days.

From this the *rolles* (rolls) were made, and these were set aside to harden for a day or two. The person doing this work was called a *rolleuse* (feminine as at Andenne, at least at this time, they were women). The rolls were then dipped in water and taken for moulding. The stem bore was made with an oiled iron wire with a projection at the end. This projection made a spiral groove in the bore, the wire being twisted as the roll was pulled over it, and this let in air, making the withdrawal of the wire easier. The wired pipe was then placed in the mould and the latter put in the vice. The bowl was then made with an oiled iron *schtoup*. This was the same implement as the *étampeux* referred to by Duhamel du Monceau. Its handle was formerly made of wood, then the ends were hollowed out to take lead in order to make the instrument heavier, and latterly the whole implement was made of iron. During this part of the process a gross was 180 pipes. The pipes were then set aside to dry, and the mould seams removed by a *schinque* (not illustrated or described but ppesumably an instrument similar to the Dutch *schenkertje* and German *Schenker*.

The pipes next reached the *trameuse* (trimmer - feminine) who smoothed them down with an instrument known as a *schmoud* (smoother), the process being known as *schmoudrage*.

The rim of the bowl was then finished off with the *boton* (button) and the pipes stacked in wooden troughs with an iron wire through them. A gross here was 174. When the pipes had reached a certain dryness - once again judged by experience - they were polished with an agate if they were destined for the smoker (those for shooting galleries and similar use were not polished). This was called le *glaçage*. At this stage a gross was 168.

When the pipes were thoroughly dry they were put in *cazettes* (saggars), round ones for small pipes, square ones for medium-sized pipes. *Cazette*, like Duhamel du Monceau's *gassette* and Lefrancq's *gazette* (see below), is a variant of *casette*, a saggar.[11] Long pipes - known as Montoises (that is, of Mons, the Belgian city) - were fired in two saggars, one inverted over the other. This process was called to *empoter*. A gross was now 144, at which figure it remained.

The saggars were then placed in the kiln, one atop the other, with a lid on the top one. The very long pipes were sometimes fired resting on sand to prevent their warping. From ca.1920 the kilns at Andenne were downdraught. Such kilns were generally square, and were far more efficient than those with the older, conventional, firing method. Wood used to be the fuel, but latterly soft coal was used. A slow flame was used, and the temperature had to reach ca. 1,100°C.

Javaux illustrates his manufacturing process with nine photographs, but unfortunately they are not of good quality and are too small to show details. It is, for example, impossible to make much out of the illustrations showing the plenne, the boton, the schtoup, the schnoud, or the saggars. It is clear, however, that the schtoup is inserted by hand, and that the moulds do not have the slot for the trimming of the bowl top with the knife which British moulds have. The fact that the stopper was inserted by hand makes the production figures quoted below all the more remarkable.

Various techniques were used to obtain colours other than the white normally produced by the Andenne clay. For example, black pipes were obtained by laying the pipes in deal sawdust in the saggars and sealing the saggar. The edge of the bowl could be blackened by resting it on a well-heated cast-iron plate;to blacken the stems the pipes were placed with their stems through holes in the top of a sheet-iron box which stood over the same cast-iron plate. Red pipes were obtained by using a red-firing clay from Germany.

To prevent the pipe sticking to the lips it was dipped in a mixture of Marseilles soap and white wax, and after being allowed to drain for a few minutes, rubbed with a soft flannel. Some pipes were dipped in unprocessed milk after firing and then put in the kiln again; this gave the pipes "the colour of wood" - presumably a creamy colour - and enhanced their smoking qualities.

A machine built by an Armand Renier of Andenne for Joseph Heurter after WW I to mass-produce pipes for shooting galleries at the rate of 12 a minute by passing three moulds on a revolving platform under a press needed such specialized handling and constant attention that it was abandoned. A moulder making undecorated pipes for shooting galleries could produce, so Javaux averred, ten gross (1,800) in 8 hrs - one woman worker turned out a gross of 180 per hour over a period of 12 or 13 hrs. Bowls with heads and faces on them, however, were made in tripartite moulds and required much more time - a good pipemaker could, it was said, produce between two and four-and-a-half gross in 8 hrs for three different pipes of this type. (These figures sound extremely high - the evidence for British pipe-production suggests about three gross a day both at present and ca.1800 for ordinary pipes. However, these latter figures include making the rolls and trimming them after moulding, so moulding by itself would produce a higher number.)

The Andenne industry still exists, but ca.1958 a machine was introduced which successfully mass-produces pipes (Neve 1960). The machine, invented by M Léonard, a pipemaker, is worked by the rolleuse and needs considerable dexterity on the part of the operator. It can produce up to 2,500 pipes a day, making them two at a time. When Neve was writing there was still a market for clay pipes among children, who used them for blowing bubbles, but this market was declining and the major markets were the shooting-galleries; in 1968 the Musée Communal de la Céramique at Andenne mentioned only production for these galleries.

The *trameuse* trims and polishes the pipes - one is shown in a picture using a blade to cut smooth the top of the bowl; apparently the button was no longer used - and, according to the article, puts on decoration.

After being dried out, the pipes are taken to the *empoteuse* - the woman who puts them in the saggars for firing. The man - the only male worker besides the owner - who looks after the firing is called the *chauffeur*. According to Neve, the pipes are fired for 24 hrs, at a temperature of 1,200°C. This is a higher temperature than that noted by Javaux, and by far the highest used by any pipemakers known. This would mean that they would give a hot smoke, but it seems possible that the extra hundred degrees recorded by Neve over Javaux's figure, if accurate, is because these pipes are not now used for smoking. Fired at that temperature they would be hard, and therefore more suitable for shooting galleries. Children using them for bubble-blowing would find they broke less easily, and shipping them would be likely to involve fewer breakages. (It may be observed that the less likely clay pipes are to break the fewer replacements are likely to be bought unless - as is the case here - there is no suitable alternative.)

Lefrancq (1970a) briefly describes the Belgian pipemaking process. He notes that the clay comes either from the Namur area or is imported from England or from Germany. Depending on the colour of pipe desired various clays are pugged and from this the *rôles* are made. The use of the term *rôle* for roll is interesting, for the word has been adopted into industrial French not for any etymological reasons but because it is pronounced the same as the English word roll. The rolls are left to dry for five or six days, and are then wired with an iron *aiguilette* (literally, a small needle). The roll is put in a bronze or steel mould, the bowl made with a rammer (no technical term is offered), and the moulded pipe taken from the mould and left to further dry for 24 hrs. The pipes are then trimmed, the process being called *tramage* (trimming), dried once again, then polished with an agate or a flint. The pipes are then stacked about 300 to a *gazette* (saggar) and between 250 and 350 saggars are put in the kiln and fired for between 12 and 36 hrs depending on the method used. Originally firing was with wood, but by 1808 coal was being used at Mons; at Nimy in 1879 between 85 and 110 bushels of coal were used to fire a daily production of 72,000 pipes. After cooling for a day the pipes are passed through a bath of wax and white soap so that they do not adhere to the smoker's lips. Those pipes which are to be glazed are not put in this liquid except for their mouthpieces.

A good *mouleur* (moulder) was able to make six gross undecorated pipes a day or two gross of the decorated pipes. A gross varied with the stage in the manufacturing process: for the moulder it was 180, at the trimming stage 174, at the *glaçage* (polishing) stage 168, and by the time the pipes were sold it was 144.

In September 1969 the writer visited the factory described by Neve - that of Léonard, the only manufacturer of clay pipes in Andenne. The clay now used at Andenne is imported from the Westerwald, according to M Léonard - there is an unresolved problem here, for at Gouda it was said that the clay used there came from the area of Liège, which is only ca.20 miles from Andenne. According to M Léonard the Andenne clay industry no longer produces suitable clay, the available beds being worked out.

The machine described and illustrated by Neve is identical to that used by Van der Want in Gouda (FIG 36) to produce cheap pipes and to those used in the Westerwald. This type of machine is described when dealing with the Westerwald industry in the following section. The same cylindrical clay lumps covered with oil are used for the rolls as in the Westerwald, and the method of using the machine is the same. The trimming has been reduced to an almost vestigial process, the fingers alone being used first to run round the rim of the bowl and then to clean off the stem. The firing is likewise primitive, the pipes simply being heaped on trays and put in the kilns without saggars.

The pipes are made by the grosse (gross) which is 174 at the trimming process and 144 when the pipes are dispatched to the retailer. Up to 30 gross of 174 each - over 5,000 - can be made in a day.

The maison Léonard had no moulds or tools of the earlier hand-production era described by Javaux, and the technical terminology described by Javaux is now virtually wholly forgotten. Some equipment and a selection of pipes however, is on display in the Musée Communal de la Céramique at Andenne. Included among the exhibits are plaster models for the production of metal pipe moulds, Dutch-style copper pipe moulds and a stopper, a wire, agate pencils, a Dutch-style schenkertje (presumably the schinque), an oil-pan, a work-bench with the chest used to hold the mould, a grooved wooden drying-rack, and a kiln with saggars. The schinque differs from the Dutch schenkertje in having a V-shaped bend at the end of the trimming-wire instead of a curve. The chest has a moving metal face turned by a handle which is unusual in having only one arm; the solid face is of wood, reinforced at the top by seven thin metal sheets screwed to it. The drying rack differs from that used in Gouda in having the grooves parallel; near one end two breaks run across these grooves, probably to take the pipe bowls staggered in two rows one behind the other so as to enable the stems to lie parallel without leaving an undue gap between each pipe. The saggars are circular and of fireclay, with wire reinforcing bindings, and closely resemble the Westerwald saggars; the kiln also closely resembles those used in the Westerwald, described in the next section.

SECTION IV
METHODS USED IN THE WESTERWALD AND BRANDENBURG AREAS, GERMANY

The German clay pipe industry (as distinct from the manufacture of porcelain pipes) appears to exist only in the Westerwald area, on the east side of the Rhine north of Coblenz. At present it produces almost wholly for the shooting-gallery, bubble-blowing, and Christmas-present markets (this last is a German custom) and is restricted to the communities of Hilgert and Baumbach, though formerly it existed elsewhere in the area, for example at Höhr-Grenzhausen. There was certainly a pipe industry in the area before the mid-C18, for ca.1750 the Höhr industry became a serious rival to that in Gouda (Helbers and Goedewaagen 1942: 18-19). The area was a pottery centre from the end of the C16 and since last century has had a flourishing tourist-orientated pottery industry producing traditionally-styled wares (Klein 1955: *passim*; I. Nöel Hume 1967; Reineking-von Bolk (ed) 1971: 44).

In April 1969 the writer visited the area and observed the manufacturing processes used by two makers - Richard Simonis of Hilgert and Wilhelm Klauer Söhne K.G. of Baumbach. Simonis is an elderly man making pipes with one assistant in a small workshop; the Klauer firm, founded in 1890, has a large factory producing 3,000,000 pipes a year and a considerable amount of pottery. All pipes are now made with the help of a machine operated by hand, even in the essentially home industry of makers such as Simonis. These machines can make both long-stemmed and short-stemmed pipes, though the former are now rarely manufactured. Klauer has a machine for these former; Simonis would make them by hand. (How long machines have been used to produce the pipes is uncertain. Those used here are the same as those used at Andenne by M Léonard and at Gouda by the Van der Want factory when they required rapid production of cheap pipes. As noted when describing Andenne pipemaking the Andenne machine was said to have been invented ca.1958 by M Léonard, an attempt after WW I to mass-produce pipes by machinery at Andenne having failed because the machine was found to be impractical. In 1923, however, the last ten workers at the Gambier firm in Givet, in France on the Belgian border, noted (see 3: V) the difficulty they had because foreign and particularly German pipes could come into France without paying duty and French pipes were made entirely by hand. The implication here is that foreign centres, doubtless Belgium and Germany, were using machinery by that date.)

The clay used for pipe manufacture is local, coming from Baumbach and Ransbach. Simonis, who used a more primitive arrangement, stored his clay outside but under cover, and when it was necessary to make a fresh mix, shovelled the clay through a window above the pile into a bath where it was left to steep for several days. It was then ladled on to the floor where it was mixed in alternate layers with *Abfall* or *Schrubschen* (spew). (*Abfall* is trimming; *Schrubschen* is the local colloquial term and cannot be convincingly identified with any known German word, though it may derive from the Dutch *schrobbles* and *scrables* - "*-schen*" denotes a diminutive.) This mixture is then put through a pug-mill and extruded through a plate with 21 holes each approximately 3/4 ins wide (FIG 42). This clay is then cut into suitable lengths and the bunches put on a set of rollers and pushed through a guillotine (FIG 43) which produces pieces approximately 1-1/4 ins long (FIG 44). These are heaped in a container and oil poured over them.

Each piece forms a pipe, and is placed in the bowl of the mould. The machine used is operated by three levers. The vertical one clamps the upper half of the mould-plate to the lower (FIGS 45-46) (these plates lie on their side and do not stand vertically; the two parts fit as do conventional pipe-moulds and can have matrices for either one or two pipes). The horizontal lever pushes home the *Stöpfer* (stopper), clay being forced out round the stopper (as in the Dutch process) and also down the stem part of the mould and out that end; and the third lever is pushed in and inserts the *Draht* (wire) into the stem (FIG 47). The pipes are removed from the mould, the worst excess clay on the stem is pulled off, and the pipes are put in a *Kasten* (box) to dry before being trimmed.

Although pipes are no longer hand-made, their method of manufacture was demonstrated. The *Rolle* (roll) is produced with both hands on the one roll, and with the assistance of a *tollbrett* (handboard - literally, a rollboard) which has a flat upper surface and a gently-curved lower surface at one end. The *Form* (mould) was put in a *Kasten* (chest)[12] where it was cushioned by a wad of paper or cardboard called *Pappe* (slot - literally, cardboard). Some moulds are of brass, others iron. The rest of the process was the same as that used in The Netherlands - a Dutch-style *Stöpfer* (stopper) (FIG 48) and *Schenker* (shanker) (FIG 48) were used. However, the stopper here had a metal handle - presumably to give it more weight - whereas the Dutch stopper has a wooden handle, and the *Schenker* had a blade set in the handle. A *Draht* (wire) was used to prevent the stems of long pipes warping while drying and the curve on the stems was made by using a curved wooden grooved tray very similar to, but smaller than, that used (without a curve) for long Dutch pipes. As with the Dutch trays, half the tray was filled with the bowls at one end and the other half with bowls at the opposite. There was no special term for this board.

The trimming of the short pipes now made is done by a woman known variously as a *Trümmerin*, *Abschneiderin*, or *Pfeifputzfrau* (trimmer) (FIG 49). (The first-noted appears to be the local technical term; the "-*in*" ending denotes a woman. The other two - literally "cutter-woman" and "pipe-cleaning woman" are straightforward non-technical terms.) The trimming is a very fast but complex process best explained in a numerical sequence. (1) Most of the remaining excess clay is cleaned off the stem with the fingers, which run down the stem from the bowl. (2) The knife - an ordinary paring knife known as a *Trimmesser* (finisher's knife) - cleans the mould-line off the side of the bowl away from the smoker, moving from the base of the bowl to the top. (3) The excess clay on the rim of the bowl is removed with the knife. (4) The inside of the bowl rim is cleaned by running a finger round it. (5) The mould-line on the top of the stem is cleaned with the knife, which is run from the bowl to the mouthpiece. (6) The pipe is turned end for end and the mould-line on the underneath of the stem removed by running the knife from mouthpiece to bowl. (7) Finally the fingers are used to smooth the stem. (Javaux (1935: 11), noting the derivation of Andenne terminology from that used at Höhr, gave a verb schmoudern to smooth for this final finishing, but neither firm visited was familiar with the term.) The whole process takes about six or seven seconds. Occasionally a Draht (wire) is used to check that the bore ran through to the bowl - in this case the wire is pointed, as is its British equivalent known as a "finishing wire". The pipes are then stacked on a Brett (board) to dry further before firing.

When higher-quality pipes used to be made, polishing was done with a Bernstein (piece of amber) or a Glattmachstein (polishing stone); and a liquid known as Wachs (wax) and made from water, beeswax, and a little soap, was used.

Both Simonis and Klauer used rather crude circular saggars with bottoms, made on the premises from fireclay. The term for saggar is Kapsel. In stacking the saggars in the kiln Simonis placed his tall saggars at the foot and the smaller ones on top (FIG 50), covering the topmost one either with a square saggar with rounded corners which was inverted or layers of paper covered with wet clay. This covering was simply called a Deckel (lid). Klauer stacked his smaller saggars at the foot and his larger ones on top (FIG 51), but the difference seems entirely to be one of preference. A number of Klauer's saggars were bound together with wire which was plastered with wet clay before being put in the kiln, and the capping here was layers of paper smeared with wet clay. Klauer also used wet clay as a strapping to close the joints between saggars. Klauer's business, being much bigger and also concerned with pottery manufacture, used mechanical assistance to load the saggars into the kiln (FIGS 52-54). The pipes were stacked in the saggars conically, bowls at the bottom.

Black pipes were obtained by firing in sawdust; unless a new saggar was also used the result would not be satisfactory, so it was said (this may be a piece of tradition rather than genuinely the case). Blackened rims were made by placing the rim on a hot metal plate.

Both manufacturers used briquettes to start the firing and for the first eight to nine hrs, but both changed to beechwood for the final hour or two (FIG 55). Klauer's said this was because the wood gave a long flame and spread the final heat better. Beech does not grow locally, and has to be imported (FIG 56); it is also used by many Westerwald potters (Reineking-von Bolk (ed) 1971: 44). Both makers fired for ten hrs and the maximum temperature reached was 950°C.

For marketing the pipes were packed in wood-shavings.

The only published account of pipemaking in Germany known to this writer is that in P.H. Sprengel's Handwerke und Künste in Tabellen, an C18 encyclopaedia continued by O.L. Hartwig, the ninth "collection" (Sammlung) of which appeared in 1772. The account deals with pipemaking in Brandenburg, but the author appears to know little about the history of the industry and nothing of the industry elsewhere in Germany, though as noted above the Westerwald industry was certainly in existence well before Sprengel was writing. Sprengel does, however, indicate that the terminology he records - regretably, he indicates in his introduction he gives only some of the technical terms - probably came from The Netherlands, from where the industry spread to Cologne before coming to Brandenburg. In what appears to be an addition to the original text he notes (pp301-2) that the first two

Berlin pipe factories opened in 1753 and 1755 and that there were two other pipe factories in the Brandenburg area, as well as a number of minor local makers.

Pipeclay is defined by Sprengel as being not quite so fine as "porcelain clay" but better than common clay. It was white in colour, though various types came in various shades of white, and retained this colour when fired. (Assuming, as true porcelain had been manufactured in Germany since ca.1709, that "porcelain clay" - kaolin - was known for what it was by the time Sprengel was writing, it seems clear that this pipeclay was not kaolin, so it was presumably a type of ball clay.) This clay, Sprengel continues, was mined in The Netherlands, in the Cologne area, at Bamberg (in Bavaria, ca.30 miles N of Nuremberg), and in the Hildesheim and Magdeburg areas of north central Germany. The Berlin factories used Magdeburg clay, the three villages of Sommersdorf, Heidersleben, and Herrenhausen near the city of Magdeburg being, according to Sprengel, the most important clay-producing centres.[13] The clays from these three centres had to be mixed according to Sprengel: one was too rich, another too poor, and a third could not take the heat of firing. A few factories added clay from Ziegeser also, but it was held to contain too much sand. Dienemann and Burre (1928: 1078) note the Saxony clays, including the Sommersdorf deposit, though this is noted as being a coloured clay. However, there is also a reference to a fat clay having been used in the potteries at Sommersdorf, which may be the clay Sprengel noted as being too rich to be used alone for pipemaking. The mixing of clays to obtain the right consistency is known elsewhere - see, for example, Plot's reference to the Newcastle-under-Lyme pipemaker Charles Riggs doing this with Staffordshire clays in the later C17 noted in 2: X. (The reference in Sprengel to clay being mined in The Netherlands may refer to Roosendaal clay (2: IX), but may possibly also refer to Andenne clay which was used in The Netherlands and possibly shipped to Brandenburg through Holland. Cologne has been noted before as supplying pipeclay - this probably refers to the clays from that area used to make the famous Rhenish stonewares of medieval and post-medieval times, though it may refer to the Westerwald clays at least some of which were shipped to Cologne for resale (see Section II above). Aachen (Aix-la-Chapelle), Raeren, Frechen, and Siegburg all lie within ca.40 miles of Cologne, and the Westerwald area lies only slightly farther away, to the south. All these centres were famous for their stonewares (see I. Noël Hume 1970: 276-85 and refs; also Dienemann and Burre 1928: 118, 181-97 for the Rhenish and Westerwald clays).)

Correct preparation of the clay was vital if it was to be pure enough to be used in pipemaking; sand in particular had to be removed as every piece would cause a hole or crack in the pipe when fired. The person in charge of preparing the clay was called a *Schlämmer* (literally, elutriator). He mixed the three clays noted above and soaked the mixture in a large wooden tub (FIG 57,e). By adding water the clay became completely liquified, and it was then worked through sieves placed over a second tub. This removed stones and other coarse impurities but not the sand. The liquid clay was then poured down a gutter to a wooden box called a *Schlämmkasten* (settling tank - literally, elutriating-box) (FIG 57,ee). As the liquid clay ran down the gutter it went through a fine hair sieve into the settling tank. In the *Schlämmkasten* were two or three partitions forming sedimentation tanks where the sand could sink to the bottom, the liquid clay running from one tank to the next. In the settling tank the clay was then dried in the sun. Because of this the clay had to be prepared before winter, for during winter and until about Pentecost the following year the clay had to macerate. When the clay was ready for final working, it was cut into rectangular pieces like bricks, and trimmed at top and bottom with a knife to remove remaining impurities.

The clay bricks were then given to the *Thonschneider* (literally, clay-cutter - the word for clay is now spelt *Ton*) who cut the blocks with a *Thonschneide* into very thin leaves. This cutter resembles, from Sprengel's drawing (FIG 57,h), a carpenter's draw-knife as used for making shingles - indeed, it would have been used in the same way.[14] This cutting further worked the clay, and from the squeaking sound made by the knife on the clay the *Tonschneider* could tell whether there were still impurities in the clay and if so, remove them. The *Tonschneider* then moistened the clay with a little water, beat it with an iron *Thonschlägel* (*Tonschlegel* - clay-mallet) to remove lumps. Finally, the clay was taken to the workshop to be used by the pipemakers.

From this clay a worker known as a *Roller* made the blanks for the pipe. These were made much thicker at one end than the other by rolling the clay on a smooth board with the fingers only. The blank was known as a *Weller* (a term defined in the *Muret-Sanders Encyclopaedic English-German and German-English Dictionary* as 1) brushwood = *Wellenholz*, 2) roll of clay for clay pipes, 3) cylinder of clay round laths, loam and straw). The skill of the *Roller* lay in his being able to judge the amount of clay needed for the various-sized pipes he might be called on to make. After making a few *Weller*, the *Roller* placed them in a bunch on top of each other to dry somewhat before they were passed on to the next worker.

The next step in the process was the moulding. This was done by the *Kaster* (the Dutch term for moulder) or *Former* (moulder). His first action was to spread linseed-oil with his finger in the groove on each half of the brass *Pfeifenform* (pipe-mould) (FIG 57,f). He then picked up the roll so that the thicker part rested on the workbench and inserted the wooden-handled *Weiserdrath* (FIG 57,g) into the roll as far as the head. (*Weiserdrath*, literally, pointer-wire - *Drath* is the modern *Draht*, wire - is translated in the Muret-Sanders dictionary with specific reference to pipemaking as "tube-wire", a term which is unknown in English pipemaking to this writer. Possibly "shanking wire", a term known in the C17 English industry, would be the equivalent.) The wired roll was then placed in the mould, the two parts of which were held together by *Vinnen* (the technical term for *Zapfen*, pin or peg; *Vinnen* seems unknown in German, but it might just possibly be a corruption of the English word pin). The mould was then mounted in a *Schraubenstange* (FIG 57,i) (literally, a screw-bar - "chest" to English pipemakers) which was described as being the same as a carpenter's vice for holding planks for planing except that it was made of iron. The bowl was then formed with the *Stopfer* (stopper) (FIG 57,b), an iron cone with a wooden handle, the cone first being dipped in linseed-oil and then forcefully rammed home. This finished, the vice was opened, the pipe lifted out with the help of the wire, the excess clay removed with a Haken (hook), a form of Schenker (FIG 57,c), and at the same time the mouthpiece was trimmed. The excess clay was called Nath, now spelt Naht - literally, seam or mould-line - according to Sprengel, but it is possible he has transposed the technical and non-technical terms for this as his non-technical term, Grad, modern Grat, seems to be the technical term to judge from dictionary entries. The pipe was then set aside to dry slowly in the shade. In order to cut down the amount of excess clay along the mould-lines, the moulder would sandstone the two halves when he noticed they were not fitting accurately.

The pipe then had to be trimmed and finished prior to firing. This was done in two stages. The first worker, called a Tremmer (trimmer), used a multi-purpose tool called simply a Messer (knife) (FIG 57,d). This tool had a wooden handle but the blade, which lay in the same plane as the handle, instead of directly joining the handle, dipped down in a U-shaped bar of metal - rather like the basket-hilt of a sword - before coming up again and joining the handle. On the base of the handle was a stamp with the maker's initials. The pipestem was smoothed with the oval-sectioned back of the blade and the bowl with the U-curve, a Tremmkopf (literally, a trim-bowl) - a horn cone - being inserted into the bowl to prevent damage to the bowl shape (FIG 57,m - not n as in text). The outer lip of the bowl was then denticulated with the saw-toothed edge of the blade, and the maker's initials put on the heel with the stamp on the base of the knife-handle (the heel is referred to as a Zapfen, spur with Ferse, literally heel, as the technical term). A stem mark comprising the name of the city of manufacture between several lines of circles was then imprinted with a marked brass plate (FIG 57,n) (Sprengel used the verb pragen, to stamp, then gives the technical term as schmussern, but here he appears to be confused, for the Muret-Sanders dictionary gives schmussen (not schmussern), a word which otherwise means to tarnish - Schmuss, dirt - as to polish clay pipes, and this seems likely, for it can plausibly be related to the verb schmoudern formerly used in the Westerwald for this process and to the Dutch smoier tool, terms which must derive from the English verb to smooth.)

The pipe then went to the second worker, the Pfeifenglaser (literally, pipe-glazer), who burnished it either with a glass pencil or preferably a piece of agate on a wooden handle (the verb used is streichen, to stroke - glasen is the technical term given; the nearest orthodox term is glasern, to do glazier's work). It was noted that this "glazing" took the place of varnishing which was used on clays of poorer quality.

The pipe was then left to completely dry (austroken - drying out - is the technical term recorded; stoving in English), for if fired with any moisture in it at all it would turn yellow. The pipes were stoved on a Trockenbrett (drying board) (FIG 57,j), being placed with bowls at alternate edges of the tray and lying in grooves. At the end of each groove was a hole to take the heel of the pipe and the bowls were stood upright.

The kiln used for firing the pipes was approximately 14 ft high overall and ca.8 ft square in section with an arched roof (FIG 57,k). The furnace had four openings front and rear approximately 18 ins square which were used to load fuel - wood - into the furnace. Under each of these openings was a draught-hole (to judge from the illustration, smaller than the stoke-hole);

other draught-holes were in the front and back walls and the roof. Above the furnace (the text says under, but this must be an error, both from the point of view of logic and of the illustration) is an iron grill on which stand the Pfeifenkasten (saggars - literally, pipe boxes). Above the level of the stoke-holes there was a door at both the front and back of the kiln through which the saggars were loaded.

The saggars were made of ordinary potters' clay such as that from the Berlin area and were approximately four ft long by about two ft in cross-section (FIG 57,1). They were stacked in the kiln beside each other in four rows. Each row comprised two piles of boxes and each pile consisted of three boxes one atop the other. In order to prevent the pipes distorting while being fired, a packing of coarsely-ground broken pipe-fragments was used in the saggars. The bottom of the saggar was covered with this and alternate layers of pipes and ground pipe-fragments built up.

The two doors were then bricked up and firing commenced, the temperature being raised slowly. For the first 3 hrs the draught-holes were tightly closed; these were then opened and the pipes fired for another approximately 11 hrs. To judge whether the pipes were properly fired, a few pieces of broken unfired pipe were attached to the outside of a saggar near a draught-hole and these were withdrawn and broken to test the firing. If the pipes had reached the correct temperature the fire was allowed to gradually die and the kiln to cool off.

In the kiln a fine dust settled on the pipes causing them to stick to the lips when used. To prevent this the outer surface of the pipe was covered in a mixture called Schnolle (translated as Tünche - whitening, also varnish) obtained by boiling tragacanth gum, white wax, and soap, and then rubbed with a cloth.

The local Brandenburg pipe factories made three kinds of long pipes, 27-Zoll, 24-Zoll, and 21-Zoll; in addition, short pipes were made which were only 6-Zoll long (respectively ca.27-7/8, 24-3/4, 21-5/8, and 6-1/8 English inches - see Appendix III). The pipes were packed in chaff in boxes and sold by the Gross (gross - the current German term is Gros).

The manufacturing process and terminology described by Sprengel offer some very interesting comparisons to those recorded in the Westerwald.

The presence of the terms Kaster, Tremmer, and Schnolle indicates, as Sprengel suggests, an ultimately Dutch origin for the Brandenburg industry, though the presence of a majority of German words for other technical terms suggests there had probably been no direct contact after the initial introduction of the manufacturing process into Germany - possibly in the Cologne area, as Sprengel also suggests. The general manufacturing process too has close connections with the Dutch. There is the elaborate preparation and mixing of the clays - this may, of course, have been partly due to the local pipe-clay being rather poor in quality. However, the peculiar cutter and its use to cut the clay blocks into thin slices seems to be without parallel elsewhere in the Western European pipemaking tradition. The tool may possibly have been adopted from carpentry, and the slicing of the clay, as Sprengel implies, may have been a necessary part of the removing of impurities from the clay. The brass moulds used, to judge from the description and also the illustration, were the same as the Dutch brass moulds, and so was the stopper, though knowledge of the *gootje* used by the Dutch to help hold the roll while wiring it had either been lost or else the Dutch pipemakers settling in Germany had reached there before the invention of the *gootje*, a tool which appears to have been a peculiarly Dutch invention as there is no trace of it ever having been used in England. In the case of the term for the stopper there is an interesting pronounciation difference between the Brandenburg term - *Stopfer* - and the Westerwald - *Stopfer*. (*Stopfer*, meaning a person who stuffs or crams - i.e. a packer - is known in German).

The *Haken* used to take the excess clay from the mould-lines and trim the mouthpiece is undoubtedly the Dutch *schenker(tje)* in a simplified form, but here - unlike in the Westerwald - the technical term *Schenker* appears to have been already forgotten by the mid-C18 and the simple German term "hook" substituted. Again, the *Messer*, the multi-purpose tool used to trim the pipes, is the equivalent of the multi-purpose knife used by the Dutch which had a notch on the back of the blade for trimming the stem, a hook at the bottom of the handle for removing the dottle or pep from inside the bowl, and a saw-toothed blade to mark the lip of the bowl (the north French *estriqueux* described by Duhamel du Monceau was another fundamentally-similar tool). Unfortunately Duhamel du Monceau does not give any of the Dutch terms for the tools he describes and this particular tool has not survived in The Netherlands, but it probably did have a specific name. In Brandenburg, however, the term had apparently been forgotten by the descendants or inheritors of the pipemaking tradition, and it was simply called the German for "knife". The *Tremmkopf*, on the other hand, appears from available evidence to be a new tool. However, the *Schnolle* process follows a Dutch tradition, one which also spread to Norway (see Section VI below). The burnishing process appears to be identical to that used by the Dutch, who in any case appear to have used this type of finish very much more frequently than did the English, whose pipes suggest it was used only in the second half of the C17 and the earlier C18. The stoving boards are also very similar to the Dutch and Dutch-derived (north French, Belgian, and Westerwald) stoving boards, and there is no trace of anything so elaborate in the English industry. The saggars, however, are not the sophisticated Dutch type, and they are, at four ft by two by two, unusually large.

Sprengel does not use the term roll, which is strange in view of the widespread use of it elsewhere in the European industry. The use of the obscure term *Wesser* for roll, however, suggests the Westerwald term *Rolle* was indeed unknown in Brandenburg. In comparing the Brandenburg and Westerwald traditions one notes that Sprengel says the palms of the hand only in rolling, whereas in the Westerwald wooden boards were used. In Brandenburg the Dutch terms *kaster* and *tremmer* for moulder and trimmer respectively were used, while in the Westerwald there appears now to be no known technical term for the former and trimmer has evolved into *Trümmer(in)*. (The word *Trümmer* does occur in German, but with the meaning wreckage or rubbish.) The absence of the term *Schenker* from Brandenburg has already been noted. The Brandenburg term for saggar, *Pfeifenkasten*, is close in meaning to the Dutch *pijpenpot* and may be a translation, while *Pfeifenglaser* would be a natural German adaption of *[pijpen]glaaster*. The adaptation of the Dutch term *snollen* in the polishing operation is interesting: in Dutch the term is used as a verb and in the word *snollap* for the polishing cloth, but not for the liquid used, which is called *zeepsop*; but if Sprengel is correct the term *Schnolle* was being used in Brandenburg for the liquid. (The Muret-Sanders dictionary lists *Schnolle* and compares it to a colloquial verb *schnullen*, to suck, but this seems improbable.)

It is difficult to know if all Sprengel's observations are correct, but if so, certain inaccurate traditions appear to have built up in the particular branch of the industry he discusses. Clay pipes do not stick to the smoker's lips because of fine dust which has settled on them in the firing: this feature is an inherent property of clay when fired to the temperatures used in pipemaking. It also seems doubtful that firing an incompletely - stoved pipe would result in its turning brown - there would be a much greater possibility of its shattering in the kiln. Again, it is not likely that sand unless present in very large quantities, would cause cracks or holes in a pipe when fired unless the gravel was big enough to fall our of the body of the pipe or project in such a way as to weaken it. Certainly in ceramics sand and gravel are frequently added as tempers (undoubtedly, however, sand or gravel would detract from both the practical and aesthetic qualities of a pipe).

SECTION V:
METHODS USED IN DENMARK

Excavation at the site of the Johan Adolf Rømer pipe-factory at Nørresundby in Denmark, which operated from 1772 into the early C19, indicated that Rømer produced at least 34 different styles of conventional clay pipe as well as stub-stemmed clay pipes which took a wooden stem and were glazed with various colours. Fragments of kiln-ware were also found, which showed the saggar-types used, and also the method used to fire the glazed pipes. Examination of the then-surviving structure and of various brick-types found revealed evidence for the type of kiln used (Kristensen 1959: 109-24). However, no evidence in the way of tools is described to indicate the precise way in which the pipes were manufactured - the only relevant reference is one which notes that after Rømer had retired his brass moulds were taken over by a nearby maker and used for some years.

The evidence available for the kiln permitted a reconstruction to be drawn. The kiln was substantially square in cross-section, and of two compartments. The lower compartment was the furnace, and had a semi-circular stoking hole. Above it, supported by an arch, was the firing chamber, the floor having a number of openings to allow the heat and smoke to pass through. The entrance to the firing chamber was a rectangular opening directly above the furnace stoke-hole, and above this chamber the arched roof connected with a large chimney (FIG 58).

Two types of saggars for the conventional pipes were noted, one cylindrical and the other also circular in cross-section but with a wider top than its base. (This latter shape recalls Gouda examples, though these latter had feet.) The height of these saggars was estimated to be ca.25 ins, and there was room in the kiln for six to nine of them. (This sounds an extremely small number of saggars for a kiln-load, but though the plans and sections of the kiln (FIG 58) do not carry a scale, nor does a photograph of the kiln base (Kristensen p.109 fig 14), the latter confirms the accuracy of the plan of the kiln base and that the kiln was small. If the kiln bricks were ca.9 ins long by ca.4-1/2 ins wide - these dimensions appear to be standard for modern firebricks (cf Rhodes 1969: 86 fig 83); Kristensen (p.113) mentions "large kiln bricks", as well as arch bricks and wedge bricks, both types noted by Rhodes - the internal measurements of the firing-chamber of the kiln, allowing for mortar thickness, must have been ca.4 ft 9 ins by ca.3 ft 6 ins. Even if the bricks were bigger, the kiln still could not have been large.[15] A further indication of its smallness is the fact that later it had been converted into a large open fireplace and chimney typical of houses of this period, and that the recorded pipe-production was small - the maximum figure noted, for 1802, was only 5,000-6,000 gross a year (Kristensen p.113; see also pp310-1 below).) The terms used for the saggars are simply lerkapsel (clay container) or braendingkapsel (firing-container) - whether these are the terms which would have been used by Rømer to describe his saggars is not stated.

The glazed pipes were fixed to special clay plates for firing, and generally placed in special rectangular saggars. The procedure was as follows. Dried ("stoved" in the English industry) pipes had part of their stems broken off so as to leave approximately 1-1/4-1-1/2 ins. The stub-stemmed pipe was then stood vertically on rectangular plates of unfired clay by pushing the shortened stem into the clay. The plates were next turned upside-down and dipped into the glaze just deep enough for the glaze to touch the surface of the plate. The plates were then placed in a long rectangular saggar almost four ft long by approximately nine ins across and seven ins deep (FIG 59). The sides of the saggars had square holes in them, apparently to let water vapour escape, and near the bottom were small round holes of unknown purpose. The saggars were piled on top of each other for firing, the topmost being covered by a row of clay plates to keep out smoke and ash. Less frequently circular plates (FIG 60) were used, being placed in the foot of the cylindrical saggars for firing.

(For details of the firm involved, see 3: VII.)

SECTION VI:
METHODS USED IN NORWAY

The excavation and investigation of the Jacob Boy pipe factory at Drammen, Norway, which was in operation from 1752 to sometime after 1788, revealed some evidence of the manufacturing process used there (Pettersen and Alsvik 1944: passim, esp. 32-40). Unfortunately the authors also use Diderot and Sprengel as sources for comparison and it is occasionally difficult to differentiate between interpolations from these two sources and what is actually known about Boy's work. In 1754, only two years after the business had been started, the firm was using 13 different moulds, and as late as 1767, when Boy had been trying to sell the business for a year and production was presumably down from earlier days, a price-list of the firm still lists 13 types. The excavations in fact revealed approximately that number of recognizable types.

An inspection for fire safety gives a detailed description of the whole Boy property, which was considerable and clearly that of a well-to-do man - it was on the street which housed the city's richest and most powerful business district. Of more use from the point of view of describing aspects of pipe-manufacture, however, is an account of an inspection of the factory by a justice of the peace and six jurors in 1754, shortly after the factory had been set up.

The factory lay immediately behind Boy's house and had two storeys and a basement. Prepared clay and the moulded but unfired "green" pipes were stored in the basement to keep them at an even temperature throughout the year. A deep well and pump was apparently also located in the basement, the clay having to be kept moist for working at all times. Unrefined clay was kept outside in a shed, probably in order to macerate. The workshop lay above the cellar, with large tables on both sides of the room along the walls. Boy employed a master, who was probably responsible for running the business; four apprentices who made the rolls; five journeymen who moulded the pipes, six young women who trimmed, polished, and marked the pipes; and two labourers who screened and cleaned the clay and did many other daily chores. A man who made and repaired moulds was also on staff. Also on the ground floor was a locked storeroom where the fired pipes were stored prior to packing in barrels. The kiln was in the centre of the building and situated on the ground floor; on the evidence of a woodshed attached to the north side of the building and under the same roof as the worked-clay storage shed the kiln was presumably fired with wood (other fuel would probably have been prohibitively expensive in Norway). Other rooms in the building included one for the master, one where he kept his tools, and sleeping quarters for the journeymen. The five journeymen could each produce six gross pipes a day of normal-sized pipes - that is, moulding the pipes only - or 180 gross a week; adding the products of the trainees (who appear to have been apprentices), enough pipes were produced a week to have weekly firings in the kiln. The kiln could hold 380-1/2 gross normal-sized pipes. By ca.1760, when Boy is fighting to prevent rival pipemakers from setting up in the Akerhus diocese, he notes 50 people earned a living in his factory, 30 of them working daily, which suggests the business had expanded since 1754. By 1788, however, the trade was being kept alive by only a man, a woman, and a journeyman.

The 1754 account refers to 13 different moulds (*form* - mould) as already noted, all in good shape along with their stopper and wire. The term for the stopper is the same as in English; the term used for the wire is *rørtråd*, which can be translated "pipe wire". The term *skrue* (screw) is also used to describe a piece of equipment, presumably the vice, although the term used (Pettersen and Alsvik illus. on p.21) for the vice shown by Diderot is *skruestikke*, which is the normal term for vice. The term *rull* is used for roll. The moulded pipes were put to dry on a *riffelbrett* (ridged board) - these were locally made and obviously of the Dutch or Dutch-derived tradition. The saggars, which came in different sizes to accommodate the different types of pipes to be fired, are referred to as a *leirpotte* (clay pot). How many - if any - of these terms were technical pipemaking terms is not stated. Glazed pipes are referred to, and while this generally meant polished ones similar in finish to Dutch pipes (cf *ibid*. p.43 n.4), the 1767 price-list does refer to one type, of English style, with a blue glaze and the excavations did find mouthpiece-fragments with a blue glaze (see Section VII below).

The trimming and polishing process is described (*ibid*. p.43 n.4) but unfortunately it is not clear whether the description is based on Diderot and Sprengel, both of whom are listed in the bibliography and are certainly used in the text, or on evidence specifically relating to Boy's work. The inclusion of the information in a footnote suggests the former to be the case, as does his use of the term tragacanth gum, white Sprengel uses, but the inclusion of the verb *snolle* (translated here as "to snub") to describe the rubbing of the pipes with a varnish of tragacanth gum, white wax, and soap suggests the writer has some other source as well, for Diderot does not record any Dutch technical terms (nor does his source, Duhamel du Monceau) and Sprengel uses the term *Schnolle* to refer to the liquid used, not to the rubbing on of the liquid, yet as noted earlier in Dutch *snollen* does have the meaning Pettersen and Alsvik give it. The names of the six moulders employed by Boy are not Norwegian, and five of them are probably Dutch, which suggests that the production methods followed at the Drammen factory would have followed closely those described in the section on Gouda manufacture.

Boy's original intention was to use a local clay from Blefjell, some miles to the SE, but even in his proposal of 1751 where he states that an advantage of his new factory will be that it will use local clay he is careful to include a clause allowing him to import any clay necessary for certain types of pipes duty-free. The following year Boy was able to prevent two would-be stoneware manufacturers from using the Blefjell clay on the ground that it would ruin him, but by the 1754 visit Boy appears to have been using imported clay entirely. From where this clay came is not stated. In 1752 the British embargo on exporting such clay (cf Duhamel du Monceau 1771: 10, Oswald 1960a: 43) and an expected Dutch embargo were cited as additional reasons for preventing the stoneware manufacturers from using Boy's Blefjell clay (by Dutch clay is probably meant clay shipped from The

Netherlands - probably Belgian and north French and possibly also Westerwald clay). Pettersen and Alsvik (p.38) refer to a later-established Norwegian factory (whether of pipes is not clear) using Bornholm clay, (see Section IX below; also p.309), but there is no evidence that Boy got his clay from there.

Unfortunately no account of the excavation itself is given and only the pipes are described, so that there are no details of the kiln structure (if indeed any were found) or of any saggar fragments - again if any were found. Wood, as already noted, was the fuel used, but nothing else appears to be known about the method of firing.

(For details of the firm involved, see 3: VII.)

SECTION VII
METHODS USED IN GREAT BRITAIN

No accounts of English pipemaking as detailed as Duhamel du Monceau's descriptions of French and Dutch pipemaking are known to the writer; indeed, many accounts of pipemaking written in English are of distinctly limited value.

Virtually all the accounts of English pipemaking that exist are concerned with the industry in its latter stages - the C19 and later - when the process had become relatively industrialized. By the beginning of the C19 pipemaking firms were appearing, as distinct from the single craftsman with his wife and two or three apprentices or journeymen working in his dwelling. In Liverpool in 1796 there were seven pipemakers employing ca.60 men and about the same number of women as trimmers (quoted in Oswald 1970b: 228 n.6; the date is given in Chandler 1957: 340), which suggests each maker employed ca.15-20 workers and indicates small firms were already established by this date (cf T.H. Thursfield 1907: 163). John Frederick Bryant jr, a member of an C18 Bristol pipemaking family, records (Bryant 1787: vii-viii) that prior to the Stamp Act crisis of 1765-66 his father - John Frederick Bryant sr, free 1747 - had employed ten journeypeople in his business which included making pipes for export. As Bryant sr had been able to keep himself and his wife and nine children in some comfort prior to the Stamp Act it is clear his business was a flourishing one and probably representative of a more-than-average-sized establishment of the time. At Great Yarmouth in 1757 a pipemaking premises was advertised "with a proper convenience of Shops for Three Couple of Hands" (quoted in Oswald 1970b: 239), indicating a master at that time might have had a staff of six. Houghton, writing at the end of the C17 and describing a pipemaking business, implied six was an average number of workers at that time also (Houghton 1693/4: 205).

In 1814 the surviving parts of the Elizabethan Statute of Labourers (1563) were finally revoked, removing amongst other restrictions the seven years' apprenticeship necessary to qualify for a trade. A system arose rather similar to the Dutch pipemaking "firms" of the previous century when the master-pipemaker was indeed a master and even as late as ca.1771 when the Gouda industry was in decline could employ 60 or 70 workers many of whom must have been "pipemakers" in the English sense though undoubtedly they specialized in certain aspects of the work (Duhamel du Monceau 1771: 6). In 1914 the firm of McDougall of Glasgow employed 50 men and 100 women in various aspects of pipe production (Walker and Walker 1969: 145), and by this time the heyday of Glasgow's pipe industry was over. In the second half of last century McDougalls may have had as many as 250-300 workers on their staff.

The writer has described the production methods of McDougall's as they were two months before that firm closed in November 1967 (Walker and Walker 1969) and has also visited (December 1967) the firm of Pollock of Manchester, at that time the only surviving British pipemaking firm (for two small pipemaking concerns subsequently founded, see p.385 n.). The process used by the Belfast firm of Hamilton has been described (A. Deane 1914: 8-9, 11, pl I and figs 2-4) (FIGS 61-67), as has that of the Chesterfield and Bolsover, Derbyshire, firm of Robinson (Robinson and Spence 1937: 195-6); and that of the last Leeds pipemaker, Sampson Strong, who died in 1953 and whose workshop has been re-erected partly in the Castle Museum, York, and partly in the Abbey House Museum, Leeds (FIG 68) (Anonymous 1954a; 1967). At Rainford in Lancashire, pipemaking ceased in 1956, and is described by Berry (1963). Some evidence was collected by the writer in June 1968 on the defunct Broseley industry from members of the Southorn family. Further, there is the evidence which can be deduced from the reconstructed works of the firm of Christie of Leith, Edinburgh, in the Huntly House Museum, Edinburgh (FIGS 69-70) and from original photographs of the firm (FIGS 71-72); from the equipment in the Birmingham City Museum and Art Gallery belonging to Birmingham firms of Thomas Reynolds and later E.A. Woods; from a photograph of the workshop of George Stonehouse of Gateshead (Oxberry 1937: 64-6); from the unnamed firm at Broseley - possibly one of the Southorn family - seen in another photograph (Oswald and James 1955b: 221); and from photographs taken in 1954 at White's of Glasgow (Samson 1954). There is also a description of pipemaking by Fleming (1923: 239-42) which purports to be of Glasgow pipemaking but which is in fact a crib from an article by a pipemaker which appeared in the Daily Mail at the time the last Bristol pipemaking - George's - firm closed in 1921 (Anonymous 1921b) with a few insertions which may or may not refer specifically to Glasgow methods - and in fact, such is the general tenor of Fleming's work, may or may not be true. Pritchard, describing the Bristol pipemaking industry, includes the Daily Mail account (1923: 190-1) with acknowledgements, but there is no evidence to indicate that the description is of George's process in particular, for even the Bristol Evening News account of George's closing (Anonymous 1921a) makes virtually no reference to manufacturing methods - the Daily Mail account is more likely to have been written by a London pipemaker. Lastly, there are brief accounts of the process used by the C19 Market Rasen, Lincolnshire, firm of Watkinson (Hallgarth 1962: 32; 1969: 33-4), and though the second and more detailed of these accounts contains major confusions regarding the wiring and moulding processes - which oddly enough do not occur in the earlier account - there is enough internal evidence to indicate that the description is based on accurate reminiscences of the techniques used.

All these descriptions have a quite close similarity to each other, and all deal with manufacture since about the middle of the C19, or from the beginning at the earliest. McDougall's was founded in 1846, Pollock's in 1879, Hamilton's in 1812, Strong's probably ca.1875 as the last of the family (who died in 1953) was the third generation in the business.[16] Robinson's was in existence by 1769 (although it is not clear to which period the description of manufacture belongs), Christie's was started in 1894 though the parent company in Glasgow was founded in 1857, Reynolds's in the 1850s (the equipment is at least as old as the period 1875-93), while Stonehouse had worked in Gateshead since the first decade of the C20 though his family had been pipemakers in Kingston upon Hull for generations previously. The Southorn family started pipemaking at Broseley in the 1820s - 1823 according to the family, 1829 according to R. Thursfield and taking over the business of Noah Roden (1863: 82) - and the last member was working occasionally until ca.1862 and has recently reopened (see Chapt 1 n.4) (for a discussion of the complexities of the Southorn manufacturers at Broseley see Appendix II). The illustration of manufacturing at Broseley referred to above is undated; a drawing made either from it or of the same worker appears in A.H. Dunhill 1954: 93, 1961 ed). At Rainford, pipes were being made certainly by 1674, but the process described is that of recent times. The Watkinson business in Market Rasen was started in 1843 by George Spencer Watkinson sr, who had learned the trade from his father in Grimsby; the firm was continued by a son, George Spencer jr, after the death of his father in 1885, but subsequently closed. In 1969 the factory was still standing (Hallgarth 1969: 33, lower illus.).

Latterly, the clay used came to McDougall's and Pollock's in granulated form. Prior to WW II the clay was dug out by hand, but during the war bulldozers were used. This was found to include too many impurities with the clay, so from about the early 1950s the clay has been ground. Southorn's continued to obtain their clay unground. Invariably the clay used by pipemakers now or in the recent past comes from Devon. Robinson's appear to have had a local deposit of clay available, but were soon using clay from SW England shipped via Kingston upon Hull; while at Rainford it was shipped via Liverpool or, more commonly, Runcorn. Devon clay was used by Colchester pipemakers at the beginning of this century (Christy 1907: 413). Watkinson's used Devon clay, which came to Gainsborough either by sea or via the Severn and across country by river and canal and was then taken by cart, and latterly by train, the last 20 miles to Market Rasen (Hallgarth 1962: 32; 1969: 33). If Fleming is to be trusted, the blocks of clay that arrived in Glasgow were called "tallies".

The lumps were broken down, cleaned of dirt, and placed in what Fleming calls "steeps" and Pollock's "soakers" (FIG 73) filled with water. When the clay was soaked and softened and had become plastic it was put through a pug-mill, though prior to the use of such a mill the clay was beaten with iron or wooden bars (FIG 74) or "mells" (the term used by Fleming) on an iron block of a table covered with iron plates. White's used an old mixer which had originally been steam-driven. This part of the process at Hamilton's is not described in detail but a picture (FIG 61) of the process there indicates a large bar being used to beat the clay and what appears to be a long-handled bladed instrument being used to cut the clay into slices, presumably for further mixing. As can be seen from the photograph these mixing processes spattered clay as high as the rafters. Watkinson's (Hallgarth 1960: 33) also used an iron bar to beat the clay after it had been soaked; and the Portchester, Portsmouth, firm of Leigh and Co., which was founded in 1840 and continued in business until after WW II, used iron bars in the same way, at least in earlier times (C. Green 1973a). Robinson's simply refer to this part of the process as "blunging" - they probably used steeps or soakers and blunged the clay with a rammer- or spade-like instrument. They prepared their clay with a superfluity of water and appear to have been alone in hastening the evaporation process by pouring the clay into large "evaporators" six or seven ins deep and lighting a fire beneath them - this appears to have been a technique adopted from the ceramics industry (the Robinson family were, unusually for pipemakers of this period, also in the pottery trade (Oswald and Hughes 1974: 169, 170; cf p.247 below)), for an 1827 anonymous publication entitled A Representation of the Manufacture of Earthenware... illustrating the various steps in ceramics manufacture in the Staffordshire Potteries (reproduced in G.W. Elliott 1970: 45 fig 2, and at a much smaller scale in Chapman, Chambers, and Sharpe 1970: 58 pl III.24) indicates this method of reducing the prepared clay to "about the consistence of dough". Shaw, writing in 1829, claimed that these "slip kilns" had been introduced by Ralph Shaw of Burslem in 1732, after which date they began to replace the "sun kiln", which was simply a 16-20 ft square vat ca.18 ins deep into which a layer of blunged clay was placed to partially evaporate in the sun, then another layer added to partially evaporate, and so on until the mass was 12-18 ins deep, after which it was cut out and placed in a damp cellar for use (S. Shaw 1829: 146-7, 157-8, 98, 1970 ed); but slip kilns were in use in The Potteries before 1732, certainly by 1718 when there is a reference to a kiln for "boyling clay" and possibly as early as 1713, when the inventory of a deceased potter notes a kiln for drying, but drying what is not stated (Weatherill 1970: 5 and 1971: 20). According to Shaw (1829: 98, 1970 ed), the sun kiln went back to before 1600 and even when he was writing a few were still used; presses to squeeze water out are known by the mid-C18 (Weatherill 1970: 5 and 1971: 20-1), but it was not until the second half of the C19, with Needham and Kite's apparatus patented in 1856, that filter presses appeared (Celoria 1973: 30-1). However, the slip kiln continued in use throughout the C19 until modern presses were introduced in the earlier C20 (I am grateful to Miss D.M. Griffiths, Ceramics Analyst with the Research Division of the National Historic Parks and Sites Branch in Ottawa for this last information). When the clay had been reduced to a proper consistency it was beaten in the manner described above. With granulated clay the process is simpler, the clay simply being carefully sprinkled with a shovel into the water (FIG 75).

Pollock's, McDougall's, and the Rainford firms (and probably other firms as well, though this is not stated) mixed the soaked clay with scraps (called "spew" at Rainford and by Pollock's) laid down in alternate layers. At Rainford and at Pollock's this mixture was called the "pill" (FIG 74). Pollock's put a layer of scraps down first to prevent the wet clay sticking to the pill. This mixture then went through the pug-mill. A great part of the skill in preparing the clay exactly right for use lies in this mixing and in the time allowed for the clay to blend. These skills are traditional, and handed on; there is no general standard. At McDougall's the process of soaking the powdered clay and putting it through the pug-mill was called "milling", and this clay was cut by the mill into "balls" or slabs, six of which weighed about a cwt.

This clay was then delivered to the workers. From it they took in each hand what Pollock's workers called a "nip" - enough clay from which to form with each hand a pipe of whatever size was currently being made. These pieces of clay were formed into what are generally called "rolls" though the terms "tadpoles" and "blanks" are also known; A.H. Dunhill (1954: 92, 1961 ed) talks of "dummies" at Broseley. The rolling was done with the flat of the hand with greater pressure on the edge farther away from the worker, the pressure increasing as the roll lengthened; this produced rolls with one end - destined to form the bowl - thicker than the rest. The action of the hand was called the "rub" at Pollock's. As each worker had differently-sized hands each had to work out how many rubs he or she needed to form the correct shape of roll for each type of pipe: a heavily-built man might need only half the number required by a slightly-built woman (FIGS 76-78). This again emphasizes the lack of general standards. Sometimes a wooden board was used to finish the rolling: McDougall's called it a "hand board" and used it only for rolling pipes which were to have a heel as without this treatment there was a tendency for the roll to become too thick at the neck which apparently causes the heels to come off subsequently, but Robinson's appear to have used the board simply to finish off the roll and make it straighter. The rolls were then placed on what McDougall's and Strong termed a "dozening board" (McDougall's also called it a "bench") and Pollock's called a "bunch board" (FIG 77) - at Watkinson's it is recorded they were placed in two rows of eight (Hallgarth 1969: 33) - and set aside until they had dried to a certain consistency in a hot air room (FIGS 79, 66). Again, this consistency was judged by experience, not by any set test.

After this, the rolls were dipped in water - the reason given by the anonymous observer of Strong's methods said this was because in the drying process the pipes had stuck to each other, but Pollock's have the more likely answer, that it was to make them pliable: it is impossible to dry them to the exact consistency and therefore easier to slightly over-dry them and then wet them. The end of the stems was then cut off with a "knife", a blade set in a handle as at McDougall's, or else simply nipped off with the fingers, as at Pollock's; and the rolls were ready to have their bores made (FIG 80). This was made with a "wire", often a simple implement such as a metal knitting-needle with its end blunted and slightly widened (FIG 81,h). Pollock's called this end the "button". Reynolds's wire is catalogued at Birmingham as a "moulding wire", a very old term dating to the C17 (see below). The widened end made withdrawing the wire easier, but also helped in inserting the wire - McDougall's workers demonstrated to the writer by using the pointed "finishing wire" (see below) that it is extremely difficult to pull the clay over a pointed end. The blunted end also made a cleaner hole when penetrating to the bowl. (This writer has seen only one wire which did not have the widened, blunted end - this is the wire in the collection of pipemaking equipment given to the City Museum and Art Gallery, Aberdeen, by the local firm of John Auld, a tobacconist (and presumably pipemaker) at the beginning of this century.)

The process of making the bore was always done by pulling the stem, or "shank", over the wire, not by pushing the wire into the clay which would tend to pierce the side of the roll (FIG 82). The progress of the wire through the shank was followed by feeling the button's progress. This facility is gained by experience - one of the workers at Pollock's said that when she first started pipemaking she had been unable to feel the button. The wire is lubricated before use - McDougall's used a mixture of paraffin and whale-oil, Pollock's paraffin and rape (colza) oil. No specific proportions are used, and the particular mixture used appears to be entirely traditional.

The wire was inserted to a point just short of the head of the roll which was to become the bowl, and the wired roll placed in the mould (FIG 83), normally a two-piece one (FIG 84), which was lubricated with the same mixture as that used for the wire. This was then placed in a "chest" or vice; Hamilton's called the part which actually took the mould the "runner". The chest was then closed (FIGS 85-86). Hamilton's called the handle of the chest a "flying handle" and the attachment of the handle to the chest they called the "box". "Runner" and "box" are both C17 terms (see below). In the press at Pollock's a "slot", a sheet of metal, was used to face the wooden walls in the vice: To have had metal walls would in time have damaged the metal moulds, but to have wooden walls alone would result in the mould damaging the wood. The chest with the pipemaking apparatus in Winchester Museum, which is from the C20 firm of Leigh, Portchester, has attached to the moving metal face a pad comprising a strip of wood, a strip of pasteboard, and a sheet of metal. There are close parallels here to the procedure used by Dutch and French makers and described by Duhamel du Monceau.

The chest lies against the instrument which formed the bowl, an instrument known at Rainford and at Pollock's as a "head and handle". The entire piece of equipment, chest included, is catalogued at Birmingham as a "gin", and Hamilton's talked of the "gin handle" and the "gin head" (FIG 87). The auction poster listing the effects of the Church pipemaking firm of Pentonville, London, in 1884 also refers to "ginheads" (original poster in possession of Miss E.J. Church, copy in possession of this writer). The head is a solid block of wood at one end of the chest against which the end of the mould lies and to which the handle - a lever - is attached by a large pin. (Gin is merely a variant of the word engine in its older, less technical, sense, so that here it really means simply a piece of equipment.) McDougall's had no particular name for this item. Attached to the handle was a free-swinging "stopper" (the Church auction poster refers to this tool as a "plunger"), a finger-shaped piece of metal which descended in a continuously-vertical position into the head of the mould to form the bowl when the lever was pulled down (FIG 86). Each mould has its own stopper, and the mould contains all the decoration and lettering, if any, for the particular model of the pipe. When the stopper is removed, the wire is pushed fully home to complete the bore to the bowl and the top of the bowl is cut off by the knife, using a slot near the top of the mould for the purpose (FIGS 88-89). (As noted above, Hallgarth (1969: 33) completely misunderstands the wiring and moulding processes at Watkinson's: he says that the wire was "rolled into the stem", that "an iron box press or mould" was used to shape the stem, and that the stoppers "were the matrices for the many different [bowl] designs". The wire could certainly have been rolled into the stem (shades of the aberrant Diderot description noted on p. 90 above), while the reference to "an iron press or mould" appears to be a telescoping of the functions of two separate pieces of equipment, the chest and the mould. The stoppers, of course, though forming the bowl, were not matrices for the bowl designs, the latter being imparted by the mould. Curiously, Hallgarth is correct in his earlier, briefer, description (1962: 32), where he simply says "Metal moulds were used for the final shaping, including the embossing of a pattern, with maker's name or initials, on the bowl".)

The part of the process so far described appears to be generally called "moulding" - unlike the situation Duhamel du Monceau describes, where the rouleur and mouleur are different people. It may merely be, of course, that in the present attenuated state of the industry the luxury of specialists to this degree can no longer be afforded. Pollock's had not heard of the term "roller" for the person making the rolls.

The newly-moulded and still-moist pipes were then removed from the mould and stacked with the others to dry further. Strong is said to have removed the wire before taking the pipe from the mould, but it seems that the opposite sequence was the normal process. When the correct dryness, as judged by experience, had been reached, the pipes were taken for "trimming" (Hamilton's and the Daily Mail reference) or "finishing" (McDougall's and Pollock's) or - the term apparently used at Robinson's - "dressing" (FIG 65). Various tools were used (FIG 81). McDougall's used a "finisher's knife", a "smoother", and a "finisher's wire". The finisher's knife was a simple blade, often originally an open razor or a table-knife, with two differently-sized curved notches in the blade, the larger to trim the mould-lines off the bowl, the other the stem. Different knives had differently-sized pairs of notches for different pipes (FIG 81,a,c,f). In fact, however, the correct-sized notch for the correct pipe was seldom available, and the McDougall's workers were using the straight back of the knife for trimming. With this implement the line of clay along the mould lines was removed (FIGS 90-91). The smoother (FIG 81,b,d,e) was a small bar of metal also with two differently-sized grooves on its lower side, and was used to rub smooth the areas scraped by the finisher's knife (FIG 92). The finisher's wire was used to check that the bore ran through to the bowl, and to poke free the "dottle" (as it was called at McDougall's) or "pep" (as Pollock's called it) - the piece of clay pushed into the bowl ahead of the moulding wire. It was also put in the pipe during trimming to prevent bending or breaking (FIG 93). The spew (trimmings) were collected for mixing with the fresh clay. When McDougall's were in full production, one "trimmer" finished the products of two moulders.

There were, however, variants of both tools and methods used in trimming. Pollock's did not generally use a finishing wire to clear the dottle or pep because they found that if the correct length of wire for making the bore was used, the pep would stick to the side of the bowl opposite the bore when the wire was pushed fully through, and thus be effectively removed. However, they did use a "finishing wire" to stiffen the still-moist pipe when it was being smoothed and finished, in which manner McDougall's also used it.

J.F. Chalkley, in an article which set out to strongly attack Harrington's theory of dating pipes by their stem bore diameters (see I: II(b)) but which in fact wandered over a large amount of irrelevant material, described the uses of a number of pipemaking tools in Birmingham City Museum and Art Gallery (Chalkley 1955a). These are illustrated in FIG 94. Unfortunately, the scholarship of Chalkley's article, and that of a subsequent, even stronger, one (Chalkley 1955b), is such that one cannot accept his statements merely because he claims to be an expert in these matters.

He says that a board, called by him a "rolling and/or stacking board", and catalogued by the Museum as a "hand board", was used as a guide for the size of the roll. The thickness of the board, he says, was used as a guide for the diameter of the head, and its width as a guide for the length of the tail. These uses seem unlikely, for the size of the rolls always seems to rely on the skill of the worker, not to any scale set by some object. Further, to use a board in this manner would necessitate a different board for each size of roll.

The wire Chalkley calls a piercer (as already noted, the Museum catalogue calls this tool a moulding wire, so Chalkley is not taking his information straight from this source). Piercers, he notes, come with many varieties of "heads" (as he calls the button) - flat nail heads, ball heads, fluted, spoons, and cones.

The knives he calls "scrapers"; this term is also used by the Museum catalogue. Object b is catalogued as a "head tool", which suggests something to do with finishing the bowl; Chalkley alleges it is a tool he calls a "hook", analogous in use to the hook on the end of the French estriqueux, used to remove the dottle (or as he calls it, pep - Pollock's term). It is most probably a tool similar to the Dutch smoier.

Object d he calls a "scraper" but with the specialized task of rounding off the lip of the bowl. The writer has seen a similar tool (FIG 81,g) in the reconstruction of the Christie workshop in Edinburgh, but its use is not stated. The Birmingham Museum catalogue, however, calls it a "shanker", which if correct would indicate it was used on the stem as a smoother (the pipe-stem is known as the shank in Britain; and as already noted the terms schenker and schenkertje - the suffix denotes a diminutive - are used for specialized finishing tools at Gouda and the term Schenker is used in the Westerwald for the same Dutch tool.) Further, virtually all C19 British pipes - and indeed earlier pipes, going back to ca.1700 as will be noted later - have a flat top to the lip of the bowl made by the knife as already described, so that the use of this tool to round off the lip of the bowl seems unlikely. That smoothing tools of the same shape as the obsolete Dutch smoier or the Dutch and German shankers - a round-sectioned wire or thin bar, straight with a sickle-shaped end and set in a wooden handle - were known in Britain is indicated by one being among the pipemaking equipment in the City Museum and Art Gallery, Aberdeen, belonging to the local turn-of-the-century firm, John Auld. Auld also had a conventional smoother made from a metal bar similar to those described earlier, and with the two grooves on one side at one end; in this case, however, the other end had been shaped into a handle.

Object g is another scraper according to Chalkley, used to scrape the inside of the bowl when necessary as the use he ascribes to the previous tool tends to leave a ridge inside of bowl. As his ascription of the previous tool is dubious the use of this one may similarly be doubted, though on the face of it some such use on the interior of the bowl for the tool is possible. The writer has not seen this tool elsewhere, but a large-bowled 25-ins long stem Southorn pipe (the same as "no 74 Long Broseley 'Churchwarden' 25 Inches Long Tips" illustrated in a post-1871 catalogue - see Appendix 11) at Blaise Castle Folk Museum, Bristol, has the inside of its bowl scraped in this manner, and Birmingham is only 27 miles from Broseley. The tool is catalogued by the museum as a "cutting off tool", which if correct does not make its purpose clear. Lastly, objects *c* Chalkley says are smoothers, which is probably the case, though they appear from the photograph (the objects cannot now be found in the museum) to be simple ungrooved circular-sectioned bars.

Chalkley refers to the head and handle as "the 'long-arm' stump-cum-vice". The stump is the stopper, and the term may be a corruption of the latter, but unfortunately all Chalkley can say about earlier stumps is that they were inserted by hand without a lever and were often very small. This last he says reflects the child labour often used, but to this writer it would appear more likely small stoppers simply reflect small pipes and the initially high cost of tobacco (see 1: V and V1).

Moulds, Chalkley says, were of brass and could last three or more generations - he mentions but does not name a maker then (in 1955) using C18 moulds. (Pollock's still - 1968 - use some iron moulds which are originally C18 in date. One is believed to date originally to 1715.) Presumably Chalkley is referring to early moulds when he says they are of brass, for all modern moulds are of iron. Benham (1906) quotes the last Colchester pipemaker as saying C17 pipes were made in wooden moulds, and Gant (*in litt*. 31 August 1970) believes that "mulberry" and "fleur de lys" pipes with these decorations on the bowl (cf Oswald 1960a: 41, 50) which he has from Colchester come from a wooden mould, but no documentary evidence of such moulds are known to this writer (cf below). A "Tinn" mould was to be given to a Southampton pipemaker apprentice at the end of his term, according to his enrolment entry in 1658/9 (Willis and Merson (eds) 1968: entry 908 and p.lxv).

Kingsford-Curram (1968: 89) says substantial metal moulds last as long as 30 years: Parsons, on the other hand (1964: 232 n.4, 247), notes that a life of ten years has been suggested for a mould though there was probably some difference between the life of brass moulds, used in the C17, and iron ones, used in the C18 and later centuries. An observer in 1832 (Weld 1832: 514) noted that iron moulds lasted "for several years, but ultimately became worn and imperfect: the vice screws last only about two years without repairs", which suggests the moulds generally lasted for longer than two years but probably not longer than say, about ten. This problem will be returned to later.

After the trimming process the pipes were placed in racks (FIG 95). If the pipe was to have a curved stem it was here that the stem was curved, the racks being deep enough to take the curve; planks are then put across the stems to hold them. At Hamilton's, Pollock's, and Robinson's and at Rainford the pipes were then taken to a drying room - Hamilton's called this part of the process "stoving"[17] - before they were fired in the kiln (FIG 66). If the weather was suitable Hamilton's put their pipes in the sun to dry (FIG 64). According to Pollock's most of the warping which occurred, particularly on long stems, took place during this drying, not during the firing. They placed planks across the stems during stoving (FIG 96) to minimize this. Southorn's fired their Churchwardens "green" - that is, unstoved - but stoved their cutties, the only time such a differentiation is recorded. A.H. Dunhill, noting the pipemaking process at Broseley (presumably Southorn's), says the longer pipes were moistened before firing (1954: 92, 1961 ed) - this may be a variant method, but it is not that described to this writer.

When stoving had brought the pipes to the right consistency they were taken for "potting" - being placed in fireclay (or, at Robinson's, iron) saggars. Once again the correct consistency is a matter of tradition and experience. At Pollock's the bench on which the saggars were placed when they were being filled was called a "potting stool". Different saggars were used for different pipe-types. McDougall's and Pollock's both used circular saggars with bottoms for their cutties (FIG 97). The pipes were laid in overlapping circles with the mouthpieces to the centre and the bowls downwards for several rows, then the next three or four rows were put in with the bowls downwards in the centre and the mouthpieces at the circumference of the saggar - this alteration achieved maximum use of space. Formerly McDougall's had stacked their cutties round a central cone.

The saggars used for Churchwardens were quite different, and also differed among firms. McDougall's used rectangular saggars with bottoms. Southorn's used rectangular bottomed saggars shaped something like a hump-backed bridge (FIG 98), presumably designed to follow the curve of the stem, and set the pipes in ground-up fired pipeclay (visible in the illustration) - this last part is similar to that sometimes used for very long pipes at Andenne, and analagous to the Gouda practice described by Duhamel du Monceau. Pollock's however, used a bottomless circular saggar (FIG 99); the bowls rested on a ridge round the inside of the saggar at the bottom and a wooden "stand" was used to hold the stems, which were arranged conically, until there were enough pipes in the saggar to support each other. Sometimes a loop of fired pipeclay was placed round the stems at their top to keep them together (FIG 100).

Pollock's described a primitive stand which comprised a lump of clay standing on four long-stemmed pipes: an example is in the Bristol City Museum, apparently from the Water St-Hollister St kiln of the John Okely F 1732 and noted in 1739; and another example - using three pipes - was discovered on the site of a Colchester pipe kiln apparently dating to the first third of the C18 (Gant *in litt*. 13 and 14 November 1968). According to Pollock (*in litt*. 14 March 1968) Strong of Leeds used a very primitive method of firing his pipes - the pipes were simply stacked up round a stand inside the kiln and no saggars were used. This method was certainly used by Flanagan of Leicester last century who worked in very primitive circumstances - his production methods are described later. At the Manning kiln in Boston, which was in use ca.1850-1919, saggar remains occur only after a ca.1860 level, the earlier levels producing instead fragments of clay rings which were apparently used to hold together a stand of pipes by supporting their bowls - many of the fragments showed impressions of identifiable bowl decoration. This suggests that prior to ca.1860 pipes were simply stacked up, perhaps round simple clay props such as those found at the site, and fastened at the bowl - and probably also at the stem ends - preparatory to firing; and in describing the Boston material the excavator cites evidence from six pipe kilns known in Leeds where evidence suggests that saggars were not used there either until about the 1860s (P.K. Wells 1970: 24-5 and 27 n.2). This would certainly agree with

Pollock's evidence on Strong's methods.

According to Fleming, black clay pipes - sold to negroes - were produced by placing coal-dust in the saggar, the smoke from this colouring the pipes in the same way as did smoke from the sawdust used at Forges-les-Eaux in France, at Andenne, and in the Westerwald. A.H. Dunhill (1954: 92; 1961 ed) describes the saggars used at Broseley, commenting that the shape was to take the curved stems, and talks of the pipes being "treated with China clay dust" while in the saggars and before firing - this may be a misinterpretation of the use of pipeclay dust noted above.

The saggars were then taken to the kiln, where they were stacked in what Pollock's call "staunches" - stands of saggars one atop the other. At Pollock's a "strapping" of green clay was used to seal the top of one saggar to the bottom of the next to prevent the flames (not the smoke) reaching the pipes (FIG 101a,b) - this was not done at McDougall's though both firms covered the top of the topmost saggar. McDougall's, Pollock's, Christie's, and latterly the Rainford manufacturers all used a downdraught kiln, and all appear to have been very similar in size and appearance, being built of brick and reinforced by encircling iron bands, with a doorway, and the fires round the outside (FIGS 102-104). (Hamilton's kiln looks at first sight very similar, but though it is not possible to see from the photograph (FIG 67) whether there were flues in the floor, pipe-fragments visible suggest a solid floor; and there appears to be a chimney at the top. It is also unclear where the fires were as the kiln is built into a corner.) At Rainford other types of kiln were also used, and according to Berry the bottle-shaped updraught "Belgian" kiln was the most common at one time. (Belgian kilns were only invented ca.1840, by the Belgian engineer Boetius. FIG 105 indicates its principle (Larsen, Riismøller, and Schlüter 1963: 366, 378-9).) A bottle-kiln was used by Southorn's (FIG 106) and probably by the previous owners of the premises, Smitheman's, from whom Southorn's took over the buildings in the 1920s. (It may also have been the type used by George's of Bristol, according to the recollections of a daughter of the last George pipemaker).

Some manufacturers at Rainford used two types of kiln, one specially for firing Churchwardens; Southorn's did similarly. The Rainford Churchwarden kilns had double walls and were updraught with the fire between the walls and the saggars on shelves in the inner chamber - in other words, a muffle-kiln.

The kilns used by McDougall's, Pollock's, Hamilton's, and at Rainford stood ca.10-12 ft high (FIG 102) - the normal, it seems, for this type of kiln - and a staunch was ca.10-11 saggars high. This size of kiln could take 300 saggars. The fires, as already noted, were round the outside, and inside there was a kind of baffle, called a "bag" at Pollock's, to keep the direct flame from hitting nearby saggars (FIG 107) (cf Brears 1971: 141). Coal was used as fuel, but the type of fuel was decided by economics rather than the type of firing obtained from various fuels. The blocking for the door was called "breast slabs" at Pollock's.

Although Hallgarth's description of Watkinson's kiln (1969: 33) is not entirely clear, it appears this firm used a simpler kiln essentially the same as the medieval double-flue kiln. This would have been an updraught, with the fires in the two five-foot long flues Hallgarth mentions, these flues going underground into the kiln (I am indebted to Miss D.M. Griffiths, Ceramics Analyst with the Research Section of the National Historic Parks and Sites Branch for a discussion on Hallgarth's description). According to Hallgarth, the kiln had nine-inch thick walls which gradually thinned as the kiln widened towards the top; the photograph of Watkinson's factory in 1969 (Hallgarth 1969: 33 lower illus.) indicates the kiln was inside and on the ground floor of the two-storey brick building, the workshops being upstairs. At McDougall's, when in full production, firing was done once a week, usually on a Wednesday. The bricking up of the door was done on the Tuesday evening and the fires lit at five or six a.m. next day. McDougal's fired to ca.940°C, Pollock's to 950-75°C, and at Rainford pipes were fired to 960°C. (Berry says 960°F for the last figure but this is an error.) Pollock's said that they always considered their firing temperatures to have been higher than the average in the industry (though it is lower than the 1,000°C used at Gouda at present and very much lower than the 1,100°C used at Courtrai and also at Andenne when pipes there were being made for smoking - Andenne now produces only for shooting-galleries and fires these pipes to 1,200°C). At McDougall's the desired temperature was generally approached about seven hrs later, though adverse wind conditions or an incompletely-cleaned flue could cause considerable delay. However, generally by mid-afternoon the furnace was allowed to cool naturally (though it was said it could be cooled a great deal faster without damaging the pipes by opening a vent in the roof) and the pipes were removed on the Friday.

There may be some confusion arising from the literature about the time taken to fire the pipes. Berry, for example, discussing the process at Rainford says that the pipes were "fired for eight to ten hours at a temperature of 960°F. [sic - °C]". This does not mean that the pipes were held at that temperature for that time; the temperature is the maximum attained and the time that of the whole firing process. Fleming similarly says that pipes were fired for 10 to 12 hrs at 500 to 600°C, but here in addition there appears to be another of Fleming's many errors, for at that temperature the chemically combined water would only just have been driven off and the clay would have been very brittle (Rhodes 1957: 16, 1973 ed). Twelve hrs is the time recorded for Hamilton's, and for the firing at White's of Glasgow (Samson 1954: 12), while Watkinson's usually fired their pipes for 11 to 13 hrs, depending on the quality of the coal used (Hallgarth 1969: 33). At Broseley the firm of A. Smitheman and Company fired their pipes for 12 to 24 hrs (Randall 1908: 442). However, at Colchester at the beginning of this century firing was accomplished in some 5 hrs - this was in a coke-fired muffle-kiln (Benham 1906).[18]

Shattering of the pipes could occur if the last-made pipes put in the kiln had not been dry enough. For this and other causes of wastage, a pipemaker's gross was generally 192 - 12 dozens of 16 - in the rolling process, gradually being reduced until by the end of the process the number was down to 144. As noted above (p.198), Watkinson's made their rolls in bunches of 16. The arrangement varied, however - McDougall's latterly made their rolls in bunches of 12, not 16. Fleming talks of a pipemaker's gross being 200.

The kilns each had their own particular idiosyncracies, certain parts being "softer" - cooler - than others, and Hallgarth, noting (1969: 33) that the packing of pipes in the kiln called for considerable skill and experience, records that at Watkinson's this was usually done by the master himself. Pipes destined for export at McDougall's and Pollock's were placed in the hotter parts of the kilns as this made them stronger and less liable to breakage; however, it also made them less porous, which made for a hotter smoke. Underfired pipes were set aside for refiring. At Rainford two trial pipes were abstracted from the kiln and rattled - the sound indicated whether the pipes were sufficiently fired or not (the differing tones of struck pipes which had been fired at different temperature were demonstrated to the writer at Pollock's.) At Rainford they then broke one of these pipes as a further test of firing. Watkinson's also withdrew a sample pipe from the kiln to check the brittleness (Hallgarth 1969: 33); and there is a reference to George's, the Bristol pipemaking firm, taking a pipe out of the kiln on a long rod to see if the pipes were fired (Anonymous 1921a).

Generally - though not at McDougall's - the mouthpiece of the pipes was coated to prevent its sticking to the smoker's lips. Pollock's use a red spirit dye. Strong is said to have used a paste of soap, wax, gum, and water to coat the mouthpiece; this mixture is the same as that noted by Duhamel du Monceau as being used in north France for the same purpose and also to give a finish to the pipe, and is closely similar to the mixture used at Gouda, Brandenburg, and Andenne for the same purposes. An alternative but very similar mixture was one of fat, clay, and water. Robinson's used a solution of red lead and the stems were then put in a clear red fire, which gave them a bright green glaze. Southorn's at one time also used a green lead glaze, but abandoned it for a different material of the same colour to eliminate the possiblity of lead poisoning. (Green appears to have been their traditional mouthpiece-colour - the writer saw examples with green mouthpieces at Southorn's Broseley factory in 1968 and in the Official...Catalogue of the 1851 London Exhibition (vol II, 725) notes the Southorn pipes there had similar mouthpieces.) Pipes made by George's of Bristol were also tripped in green (examples in possession of descendants of the George family seen by the writer), and the C19 Bristol firm of Ring is known to have used a clear green glaze (Simard in litt. 5 May 1972; see 6: VII(b)(4)), while stem-fragments with mouthpieces glazed in green, yellow, and a very light green-yellow were recovered during urban renewal in Lamb St, part of the St Jude's pipemaking ghetto in Bristol last century (see 6: VIII). Watkinson's, though they did not always apply it to their products, used red lead or potassium permanganate, fusing the glaze by heating the pipe on a coke brazier (Hallgarth 1969: 33-4). Red sealing-wax was used at Colchester at the beginning of this century to tip the more expensive pipes (Benham 1906). One source (Anonymous 1921b) said that makers used to tip their more expensive pipes with wax: this had formerly been done by heating the mouthpiece in a stove and rubbing with a stick of pipe-wax, generally red, but latterly a mixture of dissolved wax and methylated spirits was painted on. (Fleming, who at this point is following the description from the Daily Mail word for word, gives the colours as vermillion or emerald green, so possibly these were the colours he had seen in Glasgow.)

No modern British pipes approach Dutch pipes in their finishing, and it seems that few British makers attempted to give their pipes any real finish. According to information from Southorn's, the famous Broseley finish was obtained by polishing the pipe with "an amber-coloured substance" (probably a piece of amber similar to those used on the Continent) before firing, but no further details were available. McDougall's varnished their more expensive pipes - which were made of kaolin, not ball clay - with shellac; White's of Glasgow are also noted as varnishing their pipes and also sandpapered them as part of the finishing process. The products of John and Flower Hunt, Bristol pipemakers in the 1650s and 1660s, have a stroke-burnished finish for example, as do the famous Gauntlet pipes of the mid- and later C17 (see 3: I); and the same finish occurs frequently in the later C17 and earlier C18 on Bristol pipes as well as those produced at Marlborough (Atkinson 1965c: 92, rev ed 1969b) and Salisbury (Atkinson 1973: *passim*) in Wiltshire.

The firing of pipes laid in coal-dust in order to colour them has already been noted, and Fleming also notes that pipes could be glazed in the manner of pottery - this would make for a very hot smoke as the pipe would now be non-porous. He also notes that the pipes blackened by being fired in coal-dust could be waxed to imitate Irish bogoak. Harley (1963: 19) notes a J. Harrison, who made pipes at the back of the Gipsy public house in Highgate, London, at the beginning of this century, produced pipes with a black-lead finish which he was supposed to obtain by using graphite mixed with the clay: Harley believes, however, that it was almost certainly manganese dioxide which Harrison added. Graphite, being a form of carbon, would presumably burn out when the clay was fired, if it were mixed with the clay; but manganese dioxide does not seem a very likely additive either, for it would give a grey-brown colour with more of less prominent specks unless combined with iron, copper, or cobalt, in which case it would indeed give a black colour (Rhodes 1957: 45, 1973 ed). There seems no reason, however, why Harrison should have gone to the trouble of a complex additive; he probably fired his pipes in coal-dust as at Glasgow or oak sawdust as at Forges-les-Eaux or deal sawdust as at Andenne as noted above to obtain this finish. At Forges-les-Eaux a polished-black finish was obtained by *coating* pipes already mat-black from having been fired in a saggar of oak sawdust with graphite and *polishing* them with a cloth (see Section I above).

Harley also notes that another London contemporary, Crop, devised a method of producing new pipes with an amber colour similar to that of seasoned clay pipes and which would retain this colour through the process of refiring used to clean fouled pipes. (Refiring normally removed the light-brown seasoned colour as well as the fouled material.) When the last Crop retired he took with him the secret of this process, as well as destroying all the old family moulds. Harley gives the date of Crop's retirement as ca.1910 but Fresco-Corbu (1964: 1289) gives a date of 1924; the last appearance of the name in the London trade directories is in 1924. Whether these stories are true or not - unsmoked Crop pipes seen by this writer have a slightly mellowed colour but this appears to be made by a simple application of a varnish - the firm's products were of superb quality, and their elaborately-moulded heads appear as good as those of Gambier and Fiolet. (The Crop business is further discussed in 4: VI; for a discussion of the Gambier manufacturing process see Section I above).

Pollock achieved a much deeper mellowing on certain non-traditional pipe forms among his products by varnish (the three examples at the foot of FIG 108 - the rt-hand example is particularly pleasantly coloured). To facilitate varnishing the pipes are hung on a nail-board (FIG 109, showing unvarnished bowls of pipe referred to above).

According to one source (Fairholt 1859: 173), it was the Dutch who began to wax the mouthpieces of their stems, and in view of their sophisticated manufacturing techniques and products, this is possible. Other sources (Cassidy 1895: 18; T.P. Cooper 1907: 108, both probably based on Fairholt) noted that the long-stemmed "Alderman" pipes with glazed or waxed mouthpieces appeared ca.1700. A poem written in the second quarter of the C18 (quoted in Fairholt 1859: 143 and Mackenzie 1957: 196) notes that pipes had waxed mouthpieces. (For a fuller discussion of this poem see Appendix IV). Jewitt (1878: I, 298) credits a member of the famous pipemaking family of Southorn at Broseley, Edwin Southorn, with introducing the glazing of mouthpieces, but Jewitt's account of the Broseley industry seems confused and contradictory in parts - Oswald and James (1955a; 1955b) do not record an Edwin Southorn - and it seems likely that Jewitt is inaccurate here (cf Appendix II). However, so far as the writer knows, both from considerable first-hand experience and from an extensive series of sources, glazed or waxed mouthpieces are extremely rare on C18 sites - one waxed example was found in a 1755-60 context at Louisbourg, Nova Scotia (I. Walker 1971c: 70, 71), while a few waxed, slipped, and glazed mouthpieces came from a rubbish-dump at Rosewell, Virginia, datable to between 1763 and 1772 and probably to the latter year (I. Noël Hume 1962: 221; cf 1970c: 302). Glazed mouthpieces, however, are quite common on C19 sites (I. Walker 1970a: 104, 103; 1971d: 31, 32 pl 5 figs 4 and 8).

Among material excavated at a Norwegian pipe factory opened in 1752 and continuing until towards 1800 was a mouthpiece with a blue glaze (Pettersen and Alsvik 1954: illus. on p.47), and a price-list for this factory's products in 1767 lists (ibid. 38, 53) one of the 13 styles made as having a blue-glazed mouthpiece and being a pipe of "English type" (the factory made pipes in both English and Dutch bowl shapes). Thirteen pipe types were also recorded in production in 1754, and approximately that number of styles were found among the material excavated, but whether the glazed mouthpiece was this early is unknown. However, one of the Rosewell specimens had a bluish-green glaze, flecked with light brown or orange, which might indicate the Norwegian pipe was indeed closely following English pipe fashion. (The term glazed pipes unfortunately also refers in the C17 and C18 to pipes with a glossy polish - this is discussed in detail above and below - so that I. Noël Hume's reference to glazed pipes in 1764 (1970c: 297) and another reference to "long glazed pipes" of apparently about the same time (P. Miquelon 1971: 99) need not be to glazed mouthpieces. Rather earlier, in 1731, a Stamford alderman, Robert Collington, setting up a pipemaking business with "the best of workmen from London", announced he would supply "tobacco pipes of all sorts, both glazed and plain" (issue of the Stamford Mercury for 5 August 1731 in P.K. Wells files) - this in all probability does refer to a polished finish.)

It is said (G.C. Spence 1942: 62) that in taverns it was the custom to hand pipes around, and - perhaps in deference to the uncertain standards of hygiene then prevailing - to break off the end of the stem after a person had used it. I. Noël Hume (1970c: 301-2) describes this story as a fallacy and "Broadly speaking...nonsense", reasoning that the mouthpiece was made to taper so that the lips could close over it easily and that a broken and thicker end would be unpleasant in the mouth, and that a number of broken ends had been carefully filed or ground down to form a new, tapered, mouthpiece which could scarcely have been done when pipes were casually handed around. The story of biting off the stem-end during communal smoking may indeed be fictitious, but not for Noël Hume's reasons; for George Ewart Evans (see below) records a Suffolk informant recalling that "if the stem broke they'd smoke it even if it were only an inch long" (G.E. Evans 1960: 82, 1967 ed) and a recent correspondent to The Scots Magazine (vol 103 no 6 (n.s.) (September 1975) 659) recalls the "jaw-warmer" - a clay pipe with part of the stem broken off so that the bowl fitted close to the cheek - as the favourite of the building-trade labourer in the Coatbridge area near Glasgow, while this writer himself has observed clay-pipe smokers using pipes whose stems they progressively shorten either deliberately or accidentally regardless of any inconvenience from a rough end in their mouth and has also observed untapered stem fragments from C18 contexts bearing teethmarks. Further, the filing or grinding down of ends noted is almost certainly to fit a wooden or other stem over the remaining stub in order to continue using the bowl.

A common way to prevent the stem from sticking to one's lips is said to have been to dip it in beer for a few moments (Cassidy 1895: 18). The writer knows of one octogenerian in Farmborough, near Bath (FRONTISPIECE), who in 1968 was using what was perhaps a variant of this, soaking new clay pipes in beer. George Ewart Evans notes this same tradition in Suffolk at the beginning of this century: one of his informants, born in 1888, recalled

> There used to be a kind of competition among the customers [in a pub] to see who had the blackest pipe. This is what they used to do: as soon as they bought a new-clay they'd soak it in their beer. Then when they smoked it the pipe would turn as black as your hat. They'd be unwilling to part with it when it got like that; and if the stem broke they'd smoke it even if it were only an inch long (G.E. Evans 1960: 82, 1967 ed).

A possibly similar use of hot tea has also been noted (R. McDonald in litt. 21 March and 30 April 1971).[19]

The final part of the production of clay pipes is the packing. This is done in various substances - wood shavings, chaff, or straw, for example - depending on the tradition of the firm. McDougall's used wood shavings (FIG 110) while a box of pipes made by Gisclon of Lille, France, and a crate of Southorn pipes, both in the Priest's House Museum, Wimborne Minster, Dorset, indicate that Gisclon used chopped straw and chaff while Southorn used ordinary straw (FIG 111). Thomas Carlyle, writing from London in 1840 and asking a friend to have sent him pipes made by the firm of Thomas White in Edinburgh, noted that particular care should be taken with the packing, observing that previously he had ordered some from an unnamed Glasgow firm which had been sent in a deep box and packed with sawdust instead of a shallow box and packed in fine hay, resulting in only about 45 pipes surviving out of five gross (quoted in Fleming 1923: 244-5). Fleming also quoted (p.246) a worker with over 30 years' experience at McDougall's as saying, a propos of Carlyle's remarks, that he had never known Glasgow makers use sawdust and that a deep box would carry its contents far more safely than would a shallow one. Flanagan of Leicester simply used paper, but he appears to have done his distribution (through his wife) by hand, using a large wicker basket on wheels.

About the middle of last century, Stephen Chamberlain Rand, the last major Colchester pipemaker, made his rounds in a large cart, his pipes arranged on end in large baskets and casks. "Considerable knack was required" it was observed, "to arrange the pipes in the baskets so that they might escape injury when the cart went jolting over rough roads" (quoted in Christy 1907). Gant (in litt. 16 April 1968) quotes an elderly gentleman remembering the last Colchester pipemaker of all, J.F. Jennings, doing his rounds similarly in a pony and trap with the pipes set stem downwards in a basket of sawdust, their bowls "sticking out like flowers." In Lincolnshire in the second half of last century pipes were packed in straw in barrels and cases and taken round by horse and cart (Hallgarth 1969: 34); and when the business of Ebenezer Church of Pentonville, London (see 4: VI), closed in 1894 and the "stock, plant and utensils" were put up for auction, among the items listed (poster in possession of Miss E.J. Church, copy in possession of this writer) were a "Covered Van, Cob and Harness", indicating the business had delivered by horse - particularized later in the poster as a "Capital bay" - and van. The firm's 1879 price list indicates payment was COD within London, suggesting this was the area covered by the horse and van; customers outside London (see below) had to send payment with their order. The last Boston pipemaker, Joseph "Pipey" Manning who died in 1919 at the age of 70, is still remembered by some local residents as a tall man wearing a 10-gallon hat and pushing a barrow loaded with pipes round the public houses and shops (P.K. Wells 1970: 21). Fleming, writing in 1923, recalled pipe-hawkers in Glasgow making their rounds of public houses every Saturday morning "with their peculiarly shaped baskets slung on their backs stacked full of pipes" (Fleming 1923: 237); and the Chesterfield and Bolsover firm of Robinson, which continued well into the C19, had at one time an output of ca.500 gross weekly which "was largely sold to hawkers with wide-handled baskets, who peddled the goods in the neighbouring villages" (Robinson and Spence 1937: 144). An elderly Bristolian who lived in the St Jude's pipemaking ghetto in Bristol as a youngster recalls that at the turn of last century there the pipemakers took their wares round the local public houses in large baskets (see p. 750 below).

G.C. Spence (1942: 53) also recalled seeing hawkers tramping the lanes of Cheshire balancing large wicker baskets of pipes on their heads, selling at local markets and supplying inns and village shops. The Macclesfield firm of Turpin and Sons, which had been founded in 1840 and ceased pipe-manufacture in 1927 though it was still selling its stock when Spence was writing, used to supply its customers - tobacconists, grocers, but especially innkeepers - by making three-day trips in a high open box-cart three or four times a year, the rounds covering large areas of Cheshire, Staffordshire, and Derbyshire (G.C. Spence 1942: 57).

In 1739 a Hudson's Bay Company representative at York Fort (York Factory, Manitoba, on the west shore of Hudson Bay) wrote the Governor and Committee of the Company in London that

> in eighteen gross [pipes] received from England, we shall not have much above twelve gross, the rest being so short that they are of no service. With submission to your honours, if they was [sic] put in a cask or larger boxes with more straw between each lay, it would preserve them very much from being broke (quoted in Nicks 1970: 44 n.)

indicating pipes at that time were being shipped out packed in boxes in layers separated by straw. Much earlier, the Dutch were shipping pipes packed head to tail in wooden boxes holding over 250 (two-gross size?) with what appears to have been some form of seed-pod in some of the bowls which may have been packing, on evidence from the underwater excavation of the wreck of the Dutch East Indiaman Vergulde Draeck which went down off the Western Australian coast in 1656 (J.N. Green 1973 178, 283) (the excavator's alternative suggestion for the pods, that they were some form of tobacco, seems highly improbable). According to Savary des Bruslons, who was probably describing methods current in the early C18, Gouda pipemakers packed their pipes in straw or buckwheat husks in firwood chests ranging in capacity from 4 to 24 gross; Dieppe makers of the same period, by contrast, favoured hay for packing and small beechwood boxes usually of one gross capacity (Savary des Bruslons 1759-65 ed: IV, cols 199-200).

How Bristol pipemakers packed their pipes, whether for local delivery or export, is unfortunately unknown. Jackson and Price's examination of the Bristol port-books for the period 1773-1818 shows that exports at this time are almost always listed as boxes of pipes, though occasionally cases or kegs are mentioned (R. Price in litt. 18 January 1974) - this supports a reference by Latimer (1893: 414) to Bristol pipemakers having exported 500 or 600 boxes of pipes annually to the colonies prior to this trade being disrupted in 1774 by the American Revolution (see p.677 below). Presumably these containers held specified quantities of pipes, but if so, the quantities are unknown, though a 27 May 1799 shipment of "1 box, 10 groce tobacco pipes" to Wexford indicates that in this case either one box held 10 gross or else the order comprised one box plus 10 gross, implying a box held more than 10 gross. Certainly, in the mid-C19 the annual production of two Montreal pipemaking firms was quoted in boxes, one firm being noted as producing 15,000 boxes with the capability of extending this to 25,000 (Anonymous 1856c: 137, 1952 ed; see p.358 below). A New England manuscript describing the legitimate trade from there to West Africa at the beginning of the C19 refers in a context listing trade goods used in general to "large English & dutch pipes in chests" (G.E. Brooks 1970: 329); elsewhere, in giving advice on how to short-change the natives, the writer counsels

> Make two bunches of beads out of one, except barley corn. If the tooth [tusk] is under 2 rounds or 40 ells don't pay a neptune [a large brass or copper pan] - a box pipes will answer as well (Brooks op. cit. 243)

which suggests a box of pipes was a small payment and here at any rate presumably much less than the chests mentioned earlier. There is some scattered evidence both from Bristol and elsewhere that in the C17 and early

C18 shipments abroad were listed not by the container but by the gross (see pp650-1 and 655); but three 1656 references to Bristol pipes being shipped across the Bristol Channel to Caerleon and another reference in the same year to pipes being sent from Caerleon to Bristol all note boxes of pipes while "2 baskets of tobacco pipes and earthenware" to Aberthaw, 12 miles west of Cardiff, apparently presumably from Bristol, are recorded in 1700 and "four Caskes of Tobacco Pips" are recorded reaching Aberthaw from Bridgwater in Somerset in 1662 (Talbot 1969: 131).

Packing of clay pipes to ensure their safe arrival despite vigorous handling in transit is a job of some importance, for the tradition in the business is that of caveat emptor, the retailer taking loss of any breakages (e.g. Anonymous 1856a: 92); and a firm would not keep its clients long if its products did not consistently arrive in good condition (cf the remark in the ledger-book of the Angel Hotel, Abergavenny, noted in 5: 1 about "12 Gross best Broseley pipes sent without order & much broken"). In 1812 a Truro pipemaker, Samuel Randall, advertised that "he continues to sell PIPES of the best quality, on the lowest terms, and conveys them to any part of the county free of all Breakage" (Douch 1971: 151, 147). Pollock's check the efficacy of their packing - which seems to be exceptionally good - by regularly throwing a case of pipes across the factory and then opening it (J. Peterson 1968: 14). At least in the case of McDougall's, home sales were delivered by the firm's vans or carrier but export orders were delivered FOB a British port (Rodger *in litt*. 17 January 1972; see also 5: I).

As noted above, Ebenezer Church of Pentonville, London, stated in his 1879 price list that his terms for delivery within London - which was probably done with horse and van - were COD, "Country Customers" being

> respectfully informed that their Orders can only be replied to by Invoice. The Goods cannot be sent away from the Works until a Remittance has been received for the amount.

Such arrangements appear to have been traditional throughout the trade: Savary des Bruslons noted in the early C18 that

> *Ceux qui font commerce de Pipes en gros, les vendent aux Détailleurs sur les échantillons, sans faire l'ouverture des caisses, ensorte que celles qui se trouve rompues & cassées restent pour le compte de l'Acheteur. C'est un usage établi parmi les Marchands qui font ce négoce* (Savary des Bruslons 1759-65 ed: IV, col. 200; also quoted in Jean-Léo 1971: 8 and 10 from a "1726" ed [prob. the first, 1723, ed - see p. 54, n. 16 above] and in Roux *et al* 1762-64: II, 357).

Jean-Léo also notes (1971: 10, 25) that the 1909 catalogue of Victor Belle of Erôme-Gervaud (*département* of Drôme) told prospective buyers "*Nos pipes en terre sont toujours emballées avec le plus grand soin, [mais] comme cet article est fragile, nous déclinons toute responsabilité pour la casse qui pourrait se produire en course de route*".[20]

Attempts to automate pipe manufacture were made last century, but as with the similar attempt at Andenne after WW I these failed largely because the industry by its very nature has always been one where the skills of a craftsman were paramount. Indeed, nowadays *it is not the decline* in the market which is causing the demise of the industry: it is the lack of skilled workers. McDougall's markets remained steady from ca.1950 until the final running down of the industry in 1967 (Walker and Walker 1969: 146) and Pollock's can scarcely keep up with demand, particularly from North America. Pollock's in 1967 would have taken on additional workers and trained them had they been certain about the future of their factory site which was in a redevelopment zone. (In 1974 the firm moved to a nearby site.)

Fleming (1923: 239) mentions two machines patented in 1868 and 1879 designed to automate pipe production in Glasgow but that both failed because they were unable to give the craftsmanship necessary. The former machine - provisionally patented only - was patent number 2125, 3 July 1868, and the product of Andrew Kane of Dundee (not, as Fleming says, Andrew Lane of Glasgow). As described in the abridgements of patents, this was simply a system whereby the lever which pushed in the stopper simultaneously pushed in the wire. The second machine, patent number 3395, 23 August 1879, was patented to J.R. Bird and Charles G. Robinson (Fleming gives Robinson's middle initial as J.) of Glasgow and was a very complex piece of machinery designed to do the whole rolling, moulding, and wiring process. It was described as an improvement on a machine patented by one R. Golding on 5 December 1877 (patent 4607) which in turn was an improved version of an earlier machine of Golding patented 11 August 1875 (no 2823). A feature of this series of machines was that they used extremely stiff clay (cf p.199 below) but despite the series of improvements it apparently did not prove a success.

According to Jewitt (1878: I, 298), who like Fleming is not a reliable source on pipes, Edwin Southorn of Broseley introduced steampower in 1868 (how is not stated and this writer found no patent) to produce 1,500,000 pipes a year. The first patents for manufacturing clay pipes were not recorded until 1848 (cf C. Knight (publisher) 1851: 1703), but they were soon followed by a number appearing throughout the remainder of the century. All emphasize the mass-production of the item by complex machinery. One (patent 2036, 11 June 1874) describes a process which made the pipe in two parts, the joint being effected by a socket - the process was, however, only provisionally patented, and nothing more appears to have been done with it. The patent was to T. McLuckie, probably the McLuckie who is listed first with Prentice and then with Fenton working in Glasgow between 1873 and 1877. In the collection of pipes and related material in the possession of the tobacco firm W.D. and H.O. Wills of Bristol there is a mould which may have belonged to some mechanized process. It is a bipartite mould split laterally instead of vertically and with the slot to take the knife where it trims the bowl top on the side of the mould away from the stem, and it is difficult to see how it could have been used in any manual process. One patented machine (number 12,911, 6 June 1902, patentee a T.D. Young) took moulds which split in this manner, and this mould may well have come from this type of machine - unfortunately, the mould is not illustrated in the abridged descriptions of patents.

Combating decline in demand by striving for mass-production was, however, a self-destructive process, for the increase in volume was not enough to offset the decline per unit of profit which was never much at the best of times. Further, piece-rate production, emphasizing quantity not quality, militated against carefully-produced pipes and particularly against properly trimmed pipes, so that appearance frequently suffered and asked-for prices tended to be forced down. About the turn of the C19 Flanagan of Leicester was selling his cutties for 9s a gross to publicans who gave them away free to their customers (Daniell 1965: 61), and Fleming (1923: 237) remembers about the same time clay-pipe hawkers going round public houses in Glasgow every Saturday morning selling their wares to publicans who gave them away to customers; interestingly, decline in the social status and in sales of clay pipes early this century has been attributed to just this giving away of pipes in public houses (J. Peterson 1968: 13). As noted later (3: I), the London and Westminster pipemakers' guild forbade in 1805 the selling of pipes to pedlars: this may have been to prevent a pipemaker unloading sub-standard products and thereby hurting the reputation of the trade, or it may have been to prevent a maker selling large quantities at a reduced rate in the hope that a pedlar operating at poverty level could sell enough cheaply to let the maker recoup his lessened profit through volume sales to the disadvantage of other makers, but in any event the rule was clearly aimed at trying to maintain quality. Perhaps inevitably, the rule was dead by mid-century when hawking appears to have been a standard occupation (5: I), even before the demise of the guild in 1868.

Some firms did manage, however, to obtain a widespread market through production of superior products. Pipes of the famous Southorn family of Broseley last century appear in museums over most of south and west England and South Wales visited by this writer (see 6: VII(c)), and that family did have a reputation for outstandingly fine products. Much less frequent in their appearance in these museums, but occuring often enough to suggest there was still a market for superior-quality clay pipes, are French and Dutch products, and the superbly-crafted pipes by the London firm of Crop (see 4: VI) imitating the style of Gambier and Fiolet of France. The clientele for these latter pipes, however, must have been of a quite different class from the normal clay-pipe smoker (cf 6: VII(c)).

In C19 North America relatively few white clay pipes - that is, those made of ball clay - were made (other types of clay pipe were, see I. Walker 1971a and refs; Thomas and Burnett 1972; Murphy and Reich 1973; also Section VIII below). Where white pipes were made - for example in Montreal, Quebec City, and Detroit - imported English ball clay must have been used (for Canada see I. Walker 1966d, cf Lambart 1967: 10 and 1970: vii, 27 n.64; for the United States see L.W. Watkins 1950: 166; see also 4: V). As ballclay in bulk must have been much cheaper to bring across the Atlantic than specially-packed clay pipes which cost at least twice their British selling price when freight, import duties, and allowances for breakages (which last were borne by the North American vendor) were added (see 5: 1), one would have expected North American-made pipes to have had an advantage in the New World market, but this appears never to have been so, British and specifically Glasgow pipes having a continent-wide distribution last century (see 4: IV). While Glasgow pipes were traded to most parts of the world last century and must undoubtedly have had a good reputation, one cannot help wondering whether they had superior marketing or perhaps simply a lower production price which enabled them to beat North American pipemakers at their own game in their own countries. Certainly British makers took every possible step to cut as many expenses between the finished product and the customer - in this century both McDougall's and Pollock's have used members of their firms as salesmen and distributors in Britain, Ireland, and North America rather than have the expense of middlemen.

Omwake (1965b: 30-1, followed by this writer - I. Walker 1967c: 189) has suggested that the off-centre stem bore often seen on stem fragments (cf Cole 1892: 182-3; H. Scott 1917: 158) was a deliberately-made feature to facilitate the pipemaker's feeling of the progress of the wire through the stem, but another source (quoted in Fairholt 1859: 177) says the wire was inserted exactly in the centre of the roll. Pollock (*in litt*. 14 March 1968) says that while an off-centre wire might conceivably be used on a very thick stem, dead centre would be ideal, for having the bore enter the bowl offset would not look good even on a cheap pipe, and would result in uneven smoking and colouring of the pipe. Normally the button at the end of the wire can be felt even when the wire is dead centre.

FIG 112 illustrates the type of pipe which was sometimes made last century as a tour de force of skill. How they were made is uncertain. Mr Clive Southorn at Broseley, when visited in 1968, claimed he could make pipes in this manner with stems several feet long, but declined to say how, merely putting a finger up his jacket sleeve to indicate he made the technique "up his sleeve". A possibility is that a fine string was pulled through from the bowl when the wire was withdrawn, the curleques made, and the pipe then fired, burning out the string - Mr F. Fawcett, late curator of Nuneaton Museum, noted that in examining broken fragments of one of these pipes he had observed what appeared to be the impression of string in the bore. The moulding must certainly have been of a straight-stemmed pipe, and the stem length of the example illustrated here was approximately 22 ins (as noted earlier, I: II(d), the Dutch made metre-long pipes, indicating moulds and wires ca.40 ins long). Pipes in very much more complex forms and very much longer are known made in pottery (e.g. Macartney 1906: 15-16, nos III-V and VII - Staffordshire made, no 5 inscribed "John Hughes 1808"; Fleming 1923; pl XXXVI centre - made at Prestonpans, nr Edinburgh, caption dates it to 1820; A. Dunhill 1924: pls XXV,1,3,5 and XXVI,1 and 3, pp233-4 - Staffordshire, with pl XXV,6 captioned "possibly by Pratt, 1780-1790"; Edings 1931: nos I-XIV, pp230-32 - Staffordshire, one inscribed "Thomas Nicholls 1823" and two identified as possibly Pratt's and ca.1780-90; A. and C. Scott 1966: 37, 38 - Staffordshire and attrib. to Astbury, Wheildon, Pratt, and "a host of others also"; Garrett 1968: 107 top illus. - caption dates examples to late C18 and early C19; Bastien 1973: figs 65-7 - Staffordshire, "*XVIII^e siècle*"; two examples in County Museum, Carmarthen, seen 1969, one inscribed "[Will]iams Gwyfe 1808" and the other "David Jones Mason 1805"; several examples also seen at "House of Pipes" museum at Bramber, Sussex, October 1973). Edings notes one (1931: 232, 233 no XIV) a foot in overall length and probably well over 20 ft in extended length; two other styles he notes averaged ca.9 ft and a little over 12 ft respectively (cf Macartney *loc. cit*.), suggesting Mr Southorn's boast was not an idle one.

To return to moulds and their expected length of life, this of course must depend primarily on whether the shape imparted by the mould remained marketable - White's of Glasgow, who were 150 years old when they closed in 1955 (and more if they did indeed take over the pipe-manufacturing branch of the Corporation of Tobacco Spinners of Glasgow - see 4: IV) had accumulated 2,000 moulds by that time (Samson 1954: 10). In the later C19 and earlier C20 the East London firm of John George Reynolds - first noted in 1828 (Bloice in Atkinson and Oswald 1969: 223) - and its successors claimed to have 1,000 moulds available (*London Post Office Directories*).[21] The entire material of White's appears to have been destroyed when their building was taken over by a shoe-making firm (Glendale Footwear Co Ltd *in litt*. 12 January 1968); the building is not - contra Butt 1967: 266, who may have meant Christie's factory in Craignestock St - disused. McDougall's in their last days were still using between 30 and 40 of their large stock of moulds to suit regional and other tastes (Walker and Walker 1969: 145; cf Samson 1954: 12 for similar regional variety catered to by White's in their last years). Certain moulds, such as those for TD pipes (I. Walker 1966a) must have worn out relatively quickly, as this very popular style has been made continuously for at least a century; others, representing manufacturers' gimmicks or an advertising stunt, would fall out of use probably long before they became worn out.

Among the former type, apart from certain shapes such as the TD which had general popularity, can be classed those designed to appeal to certain groups. It is possible that motifs designed to appeal to the clientele of certain public houses - motifs involving the inns' signs - were being put on London-made pipes as early as the first quarter of the C17 (Atkinson and Oswald 1969: 189 and 192, 191 fig 7), and it has been suggested that Chester makers were also doing this in the first half of the C18 (Webster and Barton 1957: 19-20). Certainly, such motifs were being put on London pipes in the first half of the C19 (Atkinson and Oswald 1969: *loc. cit.* and 201).

Two London tobacconists of the C19, Milo and Inderwick, are said to have had their own brands of pipe custom-made for them (Apperson 1914: 162-3, cf Pritchett 1890: 18) and designed for the firms' discerning customers. A stem marked T. MILO S[TRAND?] has been recorded from Ontario (T. Kenyon 1970), as has a substantially-whole pipe marked T. Milo (I. Walker 1970a: 106 illus.), and bowls marked MILO/STRAND have been found in Quebec province (Barka 1970: no pagination) and in Washington state (Saastamo 1973: 88, 86 middle row left).

A mould to produce pipes with MILO facing the smoker in a sub-circular surround and a pipe from such a mould are among the pipes and pipemaking material in the City Museum and Art Gallery, Aberdeen, formerly belonging to a John Auld. Auld is said to have been an Aberdeen tobacconist at the beginning of this century; however, as he had a complete pipe-making apparatus and set of tools he must also have been a pipemaker. He has another mould and pipes with various depictions of the name Swinyard, a London, Surrey, Sussex, and Hampshire pipemaking family from the 1820s to 1926 (Atkinson 1958: 120; 1964a: 79, 81 n.9; 1967; 315; 1968: 14; Atkinson and Oswald 1969: 223-4); but as is noted below, both "Milo" and "Swainyard" [sic] were names of pipe types being produced by several Scottish makers by 1900, and as pipes of these types were actually being made in Aberdeen at this date (Anonymous 1900: 61-3) it is more likely that the moulds and pipes here represent these types than that Auld had bought Milo- and Swinyard-owned moulds. Whether original Milo and other styles were actually followed is uncertain, but the very fact the names were plagiarized indicates their popularity. Among the "Fancy Clays" listed in an 1879 price list of the products of Ebenezer Church of Pentonville, London (see 4: VI), in the possession of this writer is a "Milo Scotch", indicating the use of the term Milo for a certain type of pipe by that date. Tennyson, writing in 1895 about his father, noted that he smoked "Milos, and afterwards Dublin pipes" (quoted in Cassidy 1895: 26) - a Dublin was certainly a shape of pipe bowl, but it is unclear from this remark whether Milos also referred to a general style of pipe or to specific products of or for the firm of Milo. The occurrence of the mark SWINYARD/MAKER in a circle stamped on the bowl facing the smoker (Atkinson 1968: 14) and a mark with the same wording but with LONDON added, also facing the smoker (NMAS files), certainly suggests the Swinyard family were aware their name was being taken in vain.

However, it was possible to register a clay pipe design to protect it from imitation. Ebenezer Church (see above) successfully charged another pipemaker, William Hincher (sic) of Mount St, Bethnal Green, in 1877 with fraudulently copying his "Danube Bramble" pipe, which he had registered the previous year. Hincher claimed that the difference in the size of the ornamental thorns, those on one pipe being much larger than those on the other, was a valid distinction, but the magistrate ruled the difference was not sufficient to constitute an originality and fined Hincher £5 with £2 4s costs with the alternative of two months in jail, which latter was apparently the option taken, as the account of the case ends with the observation that the defendant was "locked up" (reported in *The Times* of 5 October 1877; original clipping in possession of Miss E.J. Church, copy in this writer's possession). Ebenezer Church took the opportunity to use this court case in one of his advertisements (original in Miss Church's possession, copy with this writer), suggesting a good eye for publicity. (Bloice (in Atkinson and Oswald 1969: 220) lists several Hensher, Hencher, and Henshaw pipemakers last century in the London area probably all related (cf also Drewett 1974: 12), including a William Hensher at Mount St, Bethnal Green, though the dates given, 1890-96, suggest this may have been a son of the William "Hincher" noted above - a Robert Hensher appears at this address from 1897.)

A John Inderwick is listed as a pipemaker at the firm's then premises in Princes St, Leicester Sq, in 1839 (Bloice in Atkinson and Oswald 1969: 221); however, as noted in 1: VII(d), Inderwick specialized in meerschaum pipes and if the firm made any pipes themselves it is more likely to have been these. Inderwick and Co are also listed as pipemakers at the end of the C19, but by this time it is much more likely they were supplying briers (cf Inderwick and Co Ltd *in litt.* 24 February 1969).

Roynane (1903: 421-2) records a pipe found at Yougal in the south of Ireland with JL on the heel or spur and "J. Luther" stamped on the stem, and identified this person with a Yougal merchant John Luther active in the time of Charles II. If the identification is correct the pipe might be a very early instance of custom-marking for advertising purposes, but insufficient description of the pipe is given to enable its dating by shape and it is perhaps more likely that there was another J. Luther somewhere, either a customer or more likely (in view of the heel- or stem-mark having his initials) a maker. However, no English pipemakers of the name Luther are recorded in Oswald 1960a or elsewhere to this writer's knowledge.

At one time the Edinburgh firm of William Christie founded in 1894 supplied many pipes "to private order for advertising purposes" (Anonymous 1964b), and in 1892 the Bristol firm of Corcoran and Co advertised that names and addresses could be stamped on quantities of its best pipes (but not, presumably, its cheaper pipes). This suggests that certain sellers of clay pipes - presumably tobacconists and publicans - were advertising themselves on chosen brands of pipe.

Two pipe-bowls in the Bristol City Museum collections bearing rubber-stamped advertisements were found in Lamb St when that part of the Bristol pipemaking area was being cleared for rebuilding in the early 1960s, and as Corcoran was working at 14 Lamb St from 1892 to 1899 these pipes may be regarded as his products. One was a plain Dublin-style bowl, the other a Dublin type with three shamrocks on the left and a harp with ERIN under and surrounded with leaf scrolls on the right. The rubber stamp in both cases were oval in shape and of the same format. The ornamented bowl was stamped WILLIAMS/ROYAL ALBERT HOTEL/MORICE TOWN/DEVONPORT, the "Williams" and "Devonport" following the curve of the stamp at the top and bottom and the rest being placed centrally. The plain bowl was stamped W. EVANS/WHITE SWAN HOTEL/SWANSEA. (The latter hotel still exists in the High St, Swansea; it was known as The Swan by 1830 and continued as this until at least 1858, but by 1875 was known as the White Swan. In 1875 the occupant was an Edward Davis and in 1887 and 1889 the occupant was a D. Jarvis; unfortunately no further information is available from the Borough Estate Office, Swansea. The Royal Albert Hotel at Devonport first appears in 1862 and from 1882 until the beginning of WW II was at 29 Martin Terrace, Keyham Rd. Directories available to Plymouth City Libraries for the period 1852-1900 did not list a Williams occupying the premises.)

George's, the last Bristol pipe-firm to close, used a similar advertising technique on their pipes. Pipes in the possession of the descendants of the George family include ones with a rubber-stamped oval in the form of a buckled belt or garter with GEORGE'S BEER on the belt at the top of the stamp and NULLI SECUNDUS inside the oval. Shortly before George's pipe factory closed in 1921 the family were also associated with a public house at their Old Market St property (now demolished) and the inn belonged to George's Brewery (now part of Courage's) and thus sold George's beer. (The two George families are not known to have been related.)

A pipe made by the Southorn family of Broseley bearing a rubber-stamped garter with the legend OPPOSITE ST. PANCRAS STATION enclosing in the centre the words THE WHITE HART was recently found at Broseley (Atkinson and Oswald 1969: 188). In the Abergavenny and District Museum, Abergavenny, there are pipes rubber-stamped with a greyhound, which were presumably products for the now-demolished Greyhound Inn in the town. A cache of pipes from the Swan Inn, Barborne, Worcester, and now in the City Museum and Art Gallery, Worcester, includes many pipes of various types bearing an oval rubber-stamped mark reading T.S. MAYMAN/SWAN INN/BARBOURNE/WORCESTER, the first and last lines following the curve of the top and bottom of the stamp and the other two being centred, "Barbourne" being in smaller letters than "Swan Inn". These pipes were almost certainly the products of Edwin Southorn of Broseley: they are identical to other specimens in the cache which bear the Southorn impressed stamp on the stem but do not have the advertising. Apparently Southorn did not put his own mark on pipes bearing a commercial for the vendor. Pipes bearing the name of a pub were common at the beginning of the C20 at Burton upon Trent, where they were handed out free. One Suffolk man who had worked in the maltings at Burton for four seasons starting in 1901 recalled

> In all the pubs up there you could get a free clay-pipe at that time - with the pub's name on it. After my first season at Burton I brought ninety clay-pipes home with me (quoted in G.E. Evans 1970: 264)

which last remark illustrates an unusual example of pipes reaching far beyond their immediate area of origin, and one which, if it was at all common to bring such pipes back, would go far to explain any concentrations of later C19-earlier C20 Broseley clay pipes - which would have been the most likely pipes to have been sold in the Burton upon Trent area - found so far away as East Anglia, for hundreds of East Anglians went annually to work in the Burton maltings from before 1880 until 1931 (G.E. Evans 1970: chapts 22-26). (As the above evidence indicates, pubs were major centres for the distribution of clay pipes: Fleming indeed, presumably talking of the Glasgow area, recalled that until ca.1890 "Every inn and tavern...kept a rack of clay-pipes with the names of their regular clients written on them" (Fleming 1923: 237), presumably in the same way that pubs today often have individual beer-mugs for some of their regulars.)

Slightly more pretentious are pipes in the County Museum, Armagh, Northern Ireland, with W. SIMPSON/IRONMONGER/ARMAGH and W.SIMPSON/TOBACCONIST /ARMAGH impressed with an oval stamp on the side of the bowl facing the smoker, (The County Museum, Armagh, in litt. 28 October 1970). An example excavated in Southwark with the name W. Boorman on the bowl and the initials T and B on the spur can be identified as a product of the Thomas Balme fl 1805-40 (Bloice in Atkinson and Oswald 1969: 217) who worked on the Mile End Rd in East London (cf I. Walker 1969: 48), while Boorman appears to have been a general grocer in Portman Square near Marble Arch during this period (Oswald 1959b: 110).[22] Such marking was apparently common enough to make some pipemakers decide, as noted above, to add MAKER after their name on their products (e.g. the Swinyard bowls noted above, the bowls marked CLARK/MAKER facing the smoker attributable to George Clark(e) of London fl 1789-1828 (Oswald 1959c: 205 fig 5(32); Atkinson and Oswald 1969: 190 fig 6,31, 189, 218), the bowl with R MOORE and MAKER moulded on the left and right sides of the bowl a little below the rim - maker unknown but probably London, bowl datable to ca.1800-40 (Atkinson and Oswald 1969: 193 fig 8,52, 192)).

That this sort of advertising was widespread is indicated by a pipe from Fort Sanders, Wyoming, with COMPLIMENTS OF THE CAPITOL CITY CLOTHING on the left side of the bowl and ON? ...COR 5th & LOCUST STS ST LOUIS on the right (R.L. Wilson 1971: 46, 78 fig 33,C). The pipe was found ca.800 miles from St. Louis; its inscriptions are moulded in large raised capitals, which indicates Capitol City Clothing were publicity-conscious enough to have arranged for custom-inscribed moulds.

Two interesting stem-markings, unique in this writer's experience, have recently been found on excavations conducted by the Research Division of the National Historic Parks and Sites Branch in Ottawa. One, on a pipe recovered from Fort George, Niagara-on-the-Lake, Ontario, read W. WHITE GLASGOW on one side and BUSH & C° AGENT on the other; the other example was on a stem-fragment from the Les Vieux Forges de Saint-Maurice site near Trois-Rivières, Quebec province, which had McDOUGALL*G- on one side and -TRAND.AGENT on the other. As the pipes were recovered from Canadian sites it is tempting to suggest the agents so advertised on the pipes were suppliers in Canadian centres and named to facilitate reordering. (There could conceivably have been an agent in Niagara-on-the-Lake - see comments on Niagara-found Ring of Bristol pipes, 6: VII(b)(4).)[23]

A rather puzzling occurrence, which may in fact be a case of a supplier's name appearing on the pipe to the exclusion of the maker's, is the pipes marked H.B.W. Russell of Liverpool known from two sites in Ghana (Calvocoressi MS). The only H.B.W. Russell listed in the Liverpool trade directories is a Henry Blythe W. Russell: he first appears in 1891 as an African merchant and commission agent, in 1892 he is a ship's-chandler and ship's stores dealer, and from 1900 the business becomes a company and is listed as African merchants, continuing to be listed in this fashion until 1933 (Liverpool Record Office in litt. 4 January 1974). One of the Ghana finds also has the mould number 243 on the stem, but it should be remembered that the maker's name and place of work were imparted by thin metal slips of metal soldered into position in the mould as the abrasive qualities of the clay necessitated repeated resetting of the lettering (see below), so there would have been no difficulty in Russell having pipes made with his own name in place of the maker's, provided the latter were willing. The continued presence after 1891 of the name of the place of manufacture, as opposed to the country of manufacture, would imply that these pipes did not go to the United States, at any rate (see 1: II(g)).

A London-made pipe with SMOKE CONQUEROR. round a circle with a shamrock in the centre stamped on the bowl facing the smoker has been found recently on a New South Wales site where there was apparently some goldmining ca.1880-90 (McBryde in litt. 29 March and 3 June 1971) and an identical bowl with the stamp, though in this case the shamrock was not noted, was recovered from Port Royal, Jamaica (Oswald 1968: 27 no 35). (The New South Wales specimen has LONDON decipherable on the left side of the stem - which is the opposite to that normally taking the place-name - but the maker's name on the other side is unfortunately illegible.) Presumably Conqueror was a brand of tobacco; a bowl from excavations near the site of Merton Priory in Surrey had SAVELS TOBACCO in a band below the rim (Turner 1971: 121). A native of Stowmarket in Suffolk recalled that at about the beginning of this century "a tobacconist could have his name and so on stamped [on clay pipes] by the makers" (G.E. Evans 1960: 82, 1967 ed).

Pipes with the moulded letters RAOB and buffalo horns were designed for the Royal Antediluvian Order of Buffaloes and still find a market today; pipes with harps and/or shamrocks on their bowls were designed to tempt Irishmen; political slogans were used. At Leicester some pipes appeared with bowls inscribed PLAY UP LEIC., others with L.C.C.C. - Leicestershire

County Cricket Club (Daniell 1965: 62) - while the Portchester, Portsmouth, firm of Leigh and Co produced a pipe featuring the Portsmouth Amateur Football Club (C. Green 1973b). The list is endless (cf Atkinson and Oswald 1969: 197-201, fig 11-12).

(A variant on the custom-made pipe was the technique, apparently introduced in 1860 by Southorn's of Broseley (so Jewitt 1878: I, 298), of transfer-printing crests, mottoes, names and monograms of patrons; names of firms, hotels, or inns; and the like on pipes - this included work in colour.)

An example of the short-lived class is an extremely elaborately moulded pipe put out ca.1845 by the Duméril firm of Saint-Omer, a pipe which must have been among their first products as they were founded in 1845. The bowl is the head of the Duke of Wellington, the stub stem is a soldier thumbing his nose at the Duke behind his back. This lampoon referred to an order made by the Duke in 1845 and designed to restrict smoking in the army (pipe illustrated in Fairholt 1859: 186 and Fresco-Corbu 1967: 1474, fig 1; the story is also told in I. Noël Hume 1974: 159). According to Mayhew (1861-62: I, 440, 1968 ed), quoting a street-seller of pipes, this pipe was the most popular of all "comic head" pipes, especially in public houses, but by 1851 (the time Mayhew was collecting this information) its popularity had long passed. This is therefore a case of a very elaborate mould being designed for an extremely popular but predictably short-lived market.

Another example in this class is one in the museum at Filkins, Oxfordshire. The bowl is the large top-hat and the head of a well-dressed man with an umbrella whose body forms part of the stem. The style of the pipe is typically French; the cravat, umbrella, boots, waistcoat, eyes, and eyebrows are glaze-coloured. On one side of the top-hat is VOILA LAMBERT in raised letters, on the other OHE! LAMBERT. These phrases reflect the rising unpopularity of Napoleon III's Second Empire, 1852-70, and specifically concerns the Empress Eugénie. Apparently she wished to find a court official named Lambert and asked the Chamberlain if he had seen him. The Chamberlain in turn asked the person next to him and the process was repeated down the line. The expression "As-tu vu Lambert?" became a catch-phrase in the streets, cafes, and theatres, and with it various replies and similar calls such as the two on this pipe (ex info. Filkins Museum).

A pipe with a stem in the shape of a musket and bowl in that of a soldier's hat, with "Sebastopol pipe" stamped on one side and "Longworth, London" on the other was put out during the Crimean War, 1854-56 (Fairholt 1859: 191, illus.; Charles Longworth is recorded as a pipemaker from 1854 to 1860, Bloice in Atkinson and Oswald 1969: 221).

The museums at Warwick, Nuneaton, Stroud, Filkins, and the private collection of A.S. Brook of Totnes each have a pipe with a parachutist on the sides of the bowl - this was apparently inspired by a poster depicting parachuting which appeared in 1889 (ex info. County Museum, Warwick). Other examples of this class are the American presidential campaign pipes, some at least made in France, and sold in the United States (Anonymous 1968e; Cousley 1972; cf Calver 1931: 96, 98-101).

More typical of the less elaborate pipe designed to be topical is one with Lord Nelson and Britannia - the latter holding a spray of laurel - on the bowl. Above Nelson's head is the word "Trafalgar" (Gant 1964), and though such pipes may have remained popular for some years they were clearly aimed at a relatively short-lived market.

Another example is a pipe with a giant bowl showing the Crystal Palace (e.g. Oswald 1959c: pl 127,e - upper left). This mould appears to have been popular, for a number of makers used it, among them W. Southorn and Co of Broseley, who illustrated it in a poster dating to 1871 or later (Anonymous n.d.[12]; Blake of London (a pipe noted in the Simcoe County Museum, Minesing, Ontario, in 1967); and Pardoe of Nantgarw, near Cardiff (I.J. Williams 1932: 140), besides a number of examples seen by the writer with no maker's identification on them (several specimens are in the "House of Pipes" museum at Bramber in Sussex).

Gimmick pipes are innumerable - a pipemaker writing in 1921 (Anonymous 1921a) noted that "Any great event, such as a Jubilee or a Coronation, used to lead to the production of new moulds illustrating the event". Even music-hall songs were used as a gimmick. NOT FOR JOE on a pipe-stem excavated on St Tudwal's Island, off the Caernarvonshire coast, was a catch phrase very popular from 1870, when the song "Not for Joseph" was written, until at least the 1890s (Hague 1961; cf Pearsall 1973: 43); and Flanagan of Leicester had a tripartite mould for a pipe with a bowl depicting a man carrying a small boy on his back with the title below SAM TORR ON HIS DADDY-O - the title of another music-hall ballad very popular at the turn of the C19 (Daniell 1965: 62, mould illus. pl V).

Pipes of this class are legion - Oswald (1959c: 207 and Plate 127,e) illustrates and notes a selection of C19 examples. That they continued into the C20 is indicated by Pollock's pipes with Edward VII on the side of the bowl and McDougall's with Edward VIII similarly depicted. Pollock's also have a pipe where the bowl is in the form of a lady's head with one of the motoring-bonnets worn in the early days of car-travelling; MOTORING GIRL is mould-impressed on the stem. The same firm also produces a pipe with the bowl representing Gladstone. Such pipes have a longer period of sale nowadays than would have been the case in the C19; partly this is because it is impossible to obtain new moulds, but partly it is due to a conscious trend towards the antique.

Chalkley (1955a: 5th page) claims that continued use of a mould wears the opposing faces, eventually resulting in an oval-sectioned stem with vertical axis longer than its horizontal axis. Chalkley is probably right here, for most stem fragments of C18 pipes studied by the writer are of that shape except towards the mouthpiece, and one would have thought that if anything oblateness in the opposite direction would have been sought after to enable a better grip by the fingers (I. Walker 1967c: 189). Markedly oval bowls, however, have been seen by the writer only in C19 material - that in the Bristol City Museum collections, for example, often comes from ill-fitting moulds and frequently exhibits markedly oval bowls with a circular inside, which suggests considerable wear on the opposing mould faces. Such poor workmanship would be in keeping with the sweated industry of last century; and it may be that earlier makers reamed their moulds from time to time to preserve a better shape, especially for the bowl - a C17 reference to pipemakers' tools includes three files (see below). Atkinson (in litt. 26 September 1971) notes that in Sussex there is a common and widely-distributed pipe datable to ca.1820 with F/C on the spur and the royal coat-of-arms on the bowl, examples of which have been found of every condition from sharp depiction to one so blurred it can hardly be made out, suggesting the mould was in use for a considerable time and that its design had been worn down.

Sprengel (1772: 296) refers to Brandenburg pipemakers sandstoning the opposing faces of their moulds when too much excess clay was observed along the mould-lines; this was to obtain sharp edges to the hollow part of the mould and as tight a fit of the two faces as possible.

The stopper also tended to wear the mouth of the mould. A mould in the Anthropological Museum, Marischal College, University of Aberdeen, and another in the City Museum and Art Gallery, Aberdeen, have identical repairs in the form of a one or more thin pieces of sheet steel rivetted to the internal face of the mould, the rivet being flush on the inside and coming out the outside corner of the mould from a drilled hole where it has been wedged in place with a piece of wood. (The moulds may have been used by the same firm - that in the former museum is unprovenanced, the other is marked "Milo" and belonged to the Aberdeen tobacconist and presumably pipemaker, John Auld. Milo was the name of a famous London pipe firm, but it was also the name of a pipe type (see above and below) known in Scotland ca.1900.)

Auld's stoppers in the City Museum and Art Gallery, Aberdeen, have a curious set of denticulated marks at their ends rather as though they had at some time been trimmed down to a smaller size or different shape, though what sort of trimming would cause such marking is difficult to say. As each mould originally came with its own stopper made to fit, one may suppose that with a declining industry old stoppers were used as replacements and where really necessary were trimmed to make an adequate fit.

The action of the knife cutting off the top of the pipe-bowl in the mould also resulted in wear at the bottom of the slot taking the knife, there sometimes being a noticeable set of scars where the knife had repeatedly hit the body of the mould. In at least some cases, however, moulds were made with a groove at this point designed to take the blade and presumably reduce wear both on the mould and the knife.

The clay itself abrades the moulds: the omission in modern times by McDougall's of the maker's name and place of work which many C19 firms put on their pipe-stems (examples in I. Walker 1971d) is because the clay wore down the letters, necessitating their repeated resetting (Walker and Walker 1969: 135). Only on pipes destined for places where the law of the country demands that foreign products bear their country of origin did McDougall's continue with lettering on the stems, and Pollock's use a rubber stamp with indelible ink on most, though not all, of their export models. Letters that formed an integral part of the pipe style, such as TD or RAOB were, of course, continued.

Prior to the sophisticated C19 styles, however, makers probably had only enough moulds to keep their businesses in full production. Pipes bearing elaborate mould-imparted decoration are known from the C17 onwards, both in The Netherlands (e.g. Brongers 1964b: 34) and England (e.g. Brongers loc. cit.; Oswald 1960a: 52; I. Walker 1966a: 90 figs 3a-3c), but they form only a very small proportion of pipes made. The earliest definitely-dated instances of mould-imparted makers' names and place of work known to the writer are stem fragments marked JAMES EATON LIVERPOOL - all on one side unlike the typical C19 marking with the name on one side and place on the other each reading from left to right - one of which occurs in a 1758-68 context at Louisbourg, Nova Scotia (Lindsay in litt. 8 November and 6 December 1972); and a similarly-marked stem reading W•MORGAN•LIVERPOOL from a ca.1760-80 context at Williamsburg, Virginia, sealed under material datable to the last quarter of the C18 (A. Noël Hume in litt. 11 August 1964). Eaton is presumably the James Eton F 1757 (Oswald 1960a: 69); Morgan must be the one noted by Oswald (1960a: 84) - misprinted as Morley - in 1767 (father of the other William "Morley" noted in 1803). A stem-fragment from an Indian site at Prince Rupert, British Columbia, has J ATHERTON &CO- on one side in standard Liverpool style and nothing on the opposite side (ex info. R. Ingles, National Museum of Man, Ottawa; pipe examined by this writer April 1973), and is presumably attributable to one of the James Athertons recorded in Liverpool between 1796 and 1805 (Liverpool Records Office in litt. 7 March 1973). Almost certainly LIVERPOOL followed the CO (or COMPANY) in the surviving inscription; certainly this use of one side of the stem only for marking continued into the early C19, for a stem marked W. HOLMES LIVERPOOL from Newport News, Virginia (Pawson 1969: 125), must be a product of the William Holmes noted in Liverpool in 1810 (Oswald 1960a: 77). Probably quite early in the C19, however, Liverpool makers were apparently converted to putting their name on one side of the stem and that of the city on the opposite side (e.g. Davoud, now MacLean, 1969a: 11, fig 18; Humphrey 1969: 17, 16 fig 8) - the pipe from Signal Hill, Newfoundland, with MORGAN on one side and LIVERPOOL on the other (Jelks 1973: 75) is therefore probably a product of one of the later Morgans, a number of whom are recorded in the later C18 and early C19. R. Thursfield (1863: 81) notes that the stamping of "names of residences" on stems began "about eighty years ago", - i.e. ca.1780 - which agrees with the other evidence.

As noted above, major firms in the C19 could accumulate thousands of moulds during their lifetime. A 1900 list of pipes made in Edinburgh and Aberdeen and by the five major Glasgow pipemaking firms (Anonymous 1900) indicates each business had a range of hundreds of styles, though naturally many were the same for each firm.[24] Some have names suggesting the shape of the pipe or its bowl, or its decoration, or at least the slogan which was the selling-point of that particular pipe, and some names descriptive of bowl-shape, such as Dublin and Billiard, still exist in the brier pipe business.

Particularly interesting, however, and a reflection of the cut-throat competition for survival in the trade, are names which plagiarize the names of famous pipemaking firms in Britain and abroad. The production of "Peter Dornie" pipes by McDougall's and Davidson's both of Glasgow, and presumably imitating pipes made by a north French maker Peter Dorni and bearing his name, or at least taking the name to get buyers to associate the pipe thus marked with the products of a famous maker, is noted in 3: V. (In the case of Dornie his name and pipe style were plagiarized in at least two other countries, The Netherlands and Germany. At least one German maker also produced pipes with DAVIDSON - spelt with a reversed N - on them (see 3: III). Another example of a foreign country using British inscriptions is a pipe in the Cuming Museum in London with BURNS CUTTY PIPE on the right side of the stem and L FIOLET S^{T} OMER on the other (Oswald files); the bowl of this pipe has moulded floral decoration and typical C19 French coloured glazes.)

However, Scottish makers also adopted names for pipe styles which included names of well-known British makers. A large number of names include the words "Milo" and "Crop", both of them names of famous London pipe suppliers (for Milo see above, for Crop see 4: VI), and this can hardly be coincidence. Little is known about Milo's, who appear to have been basically tobacconists, and they may have been closed by 1900, but certainly various Crops were making pipes from 1856 to 1924, so apparently one was able to use these words without running into legal problems. The words "Webb", "Balm" [sic] and "Swainyard" [sic] also occur, and it seems certain that the first two reflect the several Webb and Balme pipemakers in London in the first three-quarters of the C19 (Bloice in Atkinson and Oswald 1969: 225, 217) and the third the Swinyard family of pipemakers noted above who worked in London, Sussex, Surrey and Hampshire. In the case of Balm pipes it is interesting that they are sometimes associated in the sequence of numbers given to each style with a style called "Mile End", which could be a reference to that area of East London - a Thomas Balme working at Wentworth Place, Mile End Rd, early in the C19 and was succeeded there by a famous pipemaking concern, that of Ford (I. Walker 1969; see also 4: VI) - a pipe with BALME MILE END on the bowl and T/B on the sides of the heel from Waltham Abbey in Essex (Huggins 1970: 95) must undoubtedly be a product of Thomas Balme of Wentworth Place (cf bowl with BALME and ROMFORD on it and T/B on the heel sides from Barking in Essex (Harley 1964: 213, pl I) attributable to either the same Thomas Balme with a branch in Romford or another Thomas Balme working contemporaneously with the other at the beginning of the C19: Bloice (in Atkinson and Oswald 1969: 217) notes two Balmes, Thomas fl 1805-11 and John fl 1823-28, in Romford; a third is implied by a bowl fragment with P/B on the heel sides and BAL[ME] ROMFO[RD] on the body also from Waltham Abbey (Huggins loc. cit.) - Bloice (loc. cit.) notes either one or two Paul Balmes in the Mile End Rd fl 1832-54 and 1862-66).

Also appearing sometimes in the lists are "T.W." pipes: the term "Tam White" was apparently commonly used in the east of Scotland to mean a clay pipe and refered to the Edinburgh pipemaking firm of Thomas White (Fleming 1923: 243) who are recorded in business from 1823 to 1876. They were probably, at least until Chistie's of Glasgow opened a branch in Edinburgh in 1894, the major Edinburgh pipemaking firm, and so far as is known the only one to send their pipes abroad - Thomas White pipes have been found in eastern Canada (I. Walker 1971d: 25, 26 pl 3 fig, 15; see also 4: IV). As White's did produce pipes with T.W. & C°. on one side of the stem (I. Walker loc. cit.) one suspects "T.W." pipes were another case of plagiarism of a famous firm's products.

It should be remembered, of course, that in the case of firms no longer working by 1900, such as White's of Edinburgh, other firms could have bought their moulds, and indeed probably did so - Pollock's of Manchester, the last British pipemaking firm, bought moulds from McDougall's when that firm closed in 1967 (Walker and Walker 1969: 146). Thus Auld of Aberdeen could conceivably have bought genuine Milo and Swinyard moulds. However, these latter two firms' names were undoubtedly being plagiarized by 1900, and these and other instances show, as does the general prolification of pipe types, how keen pipemakers were to use any gimmick to boost their trade.

A mildly amusing variant on this sort of plagiarization occurs with a pipe (illustrated in I. Knight 1961: 34 upper photo, btm pipe) stamped "Carlyle's Pipe" after Thomas Carlyle, 1795-1881, whose indulgence in long-stemmed clay pipes was proverbial. The irony with this particular example, which to judge from the spiralling on the stem was probably a Southorn's of Broseley product, is that it had a curved stem and was (if made by Southorn's) English made; and Carlyle is recorded (quoted in Fleming 1923: 247) as being adamantly against English long-stemmed pipes because they were curved. (He also insisted on nothing but 21-ins pipes - the length of the illustrated "Carlyle's Pipe", however, is unfortunately not given.)

It is fair to assume that for the most part pipes prior to the C19 were utilitarian rather than decorative, and that on the whole the slowly-changing styles - a number of them regional - reflected in the Oswald and other typologies were as far as most manufacturers went in setting trends of style. However, as was noted in 1: II(a), and as will be noted in greater detail when dealing with the Bristol industry (6: VII(a)(2)), Oswald's type 9 bowl form, when it appeared in the 1680s, spread rapidly over the country, suggesting makers were aware of style as a selling-point; and certainly by the beginning of the C18 Bristol pipemakers were recognizing "types" of pipes, though apparently primarily based on stem lengths - a 1710 agreement signed by members of the Bristol pipemakers' guild standardized stem lengths for no fewer than five types of pipe, from "Long Pipes" at 16 ins through "Dutch Pipes" at 14 ins, "Jamayca Pipes" at 13 ins, "Pecked [?] Heeles" and "Gantletts" (sic) both at 11-1/2 ins, and "Virginia Pipes" at 8-1/2 ins (see p.15 above), though the exact meaning of some of these terms is uncertain (cf p.652 below).

Chalkley (1955a: 4th page and n.10) notes a mould made of oak and lined with sheet brass in the Curtis Museum, Alton, Hampshire (this is probably the source of Oswald's statement (1960a: 40) that there are brass moulds at Alton), and suggests that pipemakers could improvise such simple moulds to meet their needs. However, an examination in October 1968 by the writer and P. Brears then of the Curtis Museum of the collections and registers gave no indication that such a mould (or any brass moulds) ever existed there - the only object remotely resembling Chalkley's description is a wooden pipe-case in the rough shape of a pipe, made of two pieces and hinged (Oswald 1970b: 225 n.3 now notes his statement on brass moulds at Alton was based on faulty information).[25] It seems highly probable that Chalkley, who is a far from accurate writer, misidentified the pipe-case for a pipe mould. The possibility of moulds of wood and sheet metal, however, and for that matter simple wooden ones (cf above p.142), should be borne in mind, for such improvisations could have quite easily been produced, but there appears to be no actual evidence that they were used.

A simple "do-it-yourself" pipemaking machine is described by A. and C. Scott (1966: 51), but these authors are so inaccurate in much of what they recount which can be readily recognized as to source that it is difficult to accept much of what they say on other, less readily verifiable, matters - for example, after correctly describing (op. cit. 50) the roll from which a clay pipe is made as being thicker at one end than the other, they then say a "blob of clay" was put on the thicker end to form the bowl, which suggests they are conflating sources, the "blob of clay" part coming from some mid- or later C19 encyclopaedia such a Ure's (discussed pp263-5 below) and perhaps originating in Brongniart's apparent misreading of Diderot's account (discussed pp124-7 above); and they then assert (loc. cit.) that the wire had a short upward curve, a feature which would have made it quite unusable but presumably thought of by the authors as necessary to reach into the upcurved bowl. The "do-it-yourself" machine they describe as being about a foot long, essentially a bipartite mould for the bowl only, and fixed vertically to a baseboard, one half being clamped to the other by means of a screw thread after the clay had been inserted. The bowl was formed by pulling down a lever which forced a plunger into the clay in the mould. A hole at the bottom of the bowl was probably made after the bowl had been taken from the mould, and after firing a stem of some material was fitted. The drawback about calling such a machine a "do-it-yourself" kit is that the would-be pipe-smoker would have to obtain, work, and fire his own clay; it is perhaps more likely that the machine was used in a poor factory, or by a travelling pipemaker. (Nowadays the problem of obtaining moulds in the British industry is acute, and Pollock's have one of their workmen with the right flair modify their moulds as necessary. When the German clay pipe makers in the Westerwald area wished to bring out a pipe with the effigy of John F. Kennedy they found that it would have been so difficult and expensive to have a mould made that they abandoned the idea. However, as already noted, the Van der Want factory in Gouda make their own moulds when necessary, using plaster matrices.)

As noted earlier, all modern moulds in this country are of iron and probably have been since the early C18, though earlier moulds appear to have been of brass. Presumably brass and subsequently iron were found to be the cheapest or most resistant to abrasion by the clay. In Poland, where quite different pipes - of earthenware - were made, clay or wooden moulds are noted as having been used in the later C17 (Świechowska and Dukwicza 1955: 155). In North Carolina, where a central Eurpean potter introduced in 1755 the manufacture of pipes in the Polish tradition, lead or pewter and brass moulds were used (see Section VII below). (Lead moulds cannot have given the best definition of design and must have worn very rapidly, but this was probably offset by the ease with which they could be melted down and recast.) Albright also notes plaster moulds in North Carolina and suggests, observing there is no opening for the "reamer" (stopper), that clay was pressed into them by hand and used only when fast and large-scale production was not needed. However, it is more probable, as has been noted when discussing the plaster mould in the Musée du Tabac at Bergerac and the Van der Want's method of casting new moulds, that these are matrices for the production of fresh metal moulds.

Chalkley suggests (1955a: fourth and fifth pages), on the basis of his own research in unspecified parish registers of East Middlesex (apparently - Oswald 1960a: 41 n.1 - Shoreditch) that there were connections between pipemaking and brass-moulding families: he finds the two occupations (the brassfounders being originally of gunfounding families) going on in close proximity to each other, and that the same family would interchange these two trades in succeeding generations. He also notes, regarding gunfounders, that they used a pipeclay lute for bands of ornamentation on their products. Chalkley also noted (in Oswald 1960a: 40-1) that pipeclay was used in other trades such as bellfounding, pewtering, and glass-making, and that these craftemen provided initial skills in the manufacture of moulds, firing of pipes, and other aspects of pipemaking.

Chalkley also has something to say (third page) on the preparation of the clay prior to its being taken to make the rolls. According to him, broken, misfired, misshapen, and otherwise spoiled pipes were ground in mortars into a fine powder, and this was added to the elutriated clay in proportions of between one in three and one in five. It was inhaling the fine, burned, dry alumina silicate during the grinding and sieving, he says, that caused a form of silicosis resulting in death from what Stepney parish registers called "consumptions". Hence, he says, the usual apprentices in the trade were orphans, abandoned children, and the like. He claims this last point is noted in the Bristol apprenticeship rolls, but in anticipation it can be said there is no evidence there to bear out this contention. According to Chalkley (3rd page and n.4, 4th and 5th pages), all English pipes were made this way until ca.1745; this fact, he alleges, has been almost unknown and derives from the pipemakers' drawing their craft lore from other trades than that of the potter - "glassmaking, etc".

Little reliance can be placed on Chalkley's assertions, and it is tempting to dismiss them all as nonsense. The preparing of ground pipeclay could cause lung diseases, and presumably it would be added to the clay as a grog to reduce the shrinkage in ballclay, a clay which shrinks a great deal in drying; but Pollock's had never heard of this being done and did not know what would happen if it were done, nor has this writer found any evidence which would support Chalkley's contention. Mr Pollock has promised, if he can find the time, to experiment with this composition. (Presumably a more refractory body with less shrinkage on drying would be produced, which could be fired to a higher temperature and would give straighter stems.) In view of some of Chalkley's other misconceptions it is possible that the ground-up fired pipeclay to which he refers was really that used, as for example by Southorn's and in C18 Gouda, in the saggars to prevent the stems warping during firing. G.B. Hughes, who like Chalkley is not a reliable source, makes a vaguely similar claim, alleging that by ca.1780 "whiter and more costly pipes" were being made from mixtures of china clay (i.e. kaolin), ballclay, and powdered calcined flint after the manner of the finer-bodied stonewares and earthenwares being developed from the early C18 onwards (see 2: IX); but there is absolutely no evidence known to this writer which would bear this claim out, and much evidence in the form of manufacturing accounts for before and after this time to suggest the story is totally false. It is true, however, that by the C19 clay pipes frequently have a plastery texture: this appears to have been caused by the use of stiffer clay, and is discussed on p. 199 below.

As to Chalkley's references to manufacturing methods deriving from industries such as pewtering, glass-making, and the like, there is nothing in the source he gives to warrant such an interpretation; nor is there any evidence in any of the literature on pipemaking (including contemporary sources going back to the C17) known to this writer. (The source given by Chalkley - his note 4 - is "Cyclopedia of Useful Arts, Knight 1851. Glassmaking, etc." This is a completely inaccurate reference, and appears to conflate two sources - the well-known C19 encyclopaedias of Charles Knight and Tomlinson: the relevant entries in neither of these publications bear out Chalkley's contentions.)

Parsons (1964: 234 and n.15) suggests the choice before 1650 of Gateshead on the south side of the Tyne as the pipemaking centre in the North-East in preference to Newcastle on the opposite bank may have been due to the prior existence of industries there already using pipeclay, and he suggests glassmaking as the possible connection; but elsewhere (p.235) he cites Oswald (1960a: 40-1) noting the use of pipeclay in bell- and gun-founding, pewtering, and glassmaking, and Oswald is in turn citing Chalkley (cf Oswald 1970b: 235-6). According to H.J. Powell (1923: 93) coal, fireclay, and water carriage were the chief attractions of the Newcastle region to glassmakers in the early C17; and at Stourbridge (H.J. Powell 1923: 100-1; cf Angus-Butterworth 1958: 370-1) it was again the coal and in particular the clay - held to be the best in the country for making glass-foundry crucibles and furnace-linings - which attracted the industry there. This clay, described by Plot (1686: 121-2) and referred to as Amblecote clay, is a refractory fireclay (H. Powell 1968: 18); such clays are regularly found in the Coal Measures clay formations (Adams 1961: 19, 14 table II). Analyses of Stourbridge fire clays are noted below, in Section IX.

The addition of clay to the batch in glassmaking is known, but presupposes no relationship of glass-making to pipemaking (or, for that matter, to potting). The use in this fashion of "brick-clay" is noted in an early C19 encyclopaedia (Rees 1802-20: s.v. Glass, common green bottle) where a composition quoted from Loysel's Essai sur l'art de la verrerie (1800) for "a good and cheap material for bottle-glass" was as follows: "100 parts of common sand, 30 of varec (a kind of coarse kelp made on the western coasts of France), 160 of the levigated earth of ashes, 30 of fresh wood ash, or any other kind of ash, 80 of brickclay, and any quantity, generally about 100, of broken glass." What effect 80 parts of brick-clay out of 500 would have on the mixture is uncertain, although presumably it would add silica, alumina, and iron (see analysis of common red clay in Section IX below) - iron, which would already be present in the mix from the sand, would certainly make the glass green. A compositon of "common sand, lime, some clay, and impure alkali" is noted in 1855 for manufacturing green bottle glass (M.F. Rogers jr 1963: 27). In 1894 one Arthur P. Ayling of Milwaukee patented a batch for "German green glass" which comprised clay "preferably in the form of pulverized or broken brick", ordinary sand, and salt-cake (sodium sulphate) in the proportions by weight of ca.100, 100, and 40 respectively (United States Patent 522,001 26 June 1894), and the next year Ayling patented a batch for amber bottle-glass which consisted of sand, finely crushed furnace-slag (which is mainly silicate of lime), clay - again preferably pulverized or broken brick - and salt-cake in the proportions of

140, 70, 50, and 70 (United States Patent 552,091,31 December 1895). In both cases the clay used was a local Milwaukee clay which produced cream-coloured brick, and the preference for it to be in the form of broken brick was because the clay was in better condition for melting in this state (it was also cheaper to obtain). However, it was stated that other varieties of clay could be successfully used. The use of pipeclay, which is virtually iron-free, in the batch occurs in one of seven formulae for what is called Bohemian Crown Glass: seven parts of pipeclay are listed together with 650 parts sand, 225 lime, 200 soda, 250 cullet, and 7 nitre (Biser and Koch 1899: 84-5). Crown-glass was substantially clear and used for such things as windows - it thus had to be iron-free, so the absence of brickclay is understandable, and another observer (Bastow 1920: 57-8) notes that in the making of optical glass a mixture of china and ball clays was evolved to replace ordinary clay in the batch because the latter was found to contain ca.2-4% iron whereas the china clay-ballclay mixture had only ca.0.4%. A British patent of 1856 (number 2537, L.J.F. Margueritte) notes that certain clays could be used to produce green bottle glass while kaolin could be used for window and mirror glass. The need for this addition is not explained, but Bastow also notes (1920: 38-9) that china clay (kaolin), being a silicate of alumina, was used as an opacifier (i.e. to make glass opaque) and that it also had the property of absorbing the attack of the fluorides on the clay body of the crucible. As crown and optical glass had to be clear, the reason for adding ballclay to the batch is still not obvious, but at least in the small amount in the formula noted above it may have been to absorb the fluorides. (I am grateful to Miss O. Jones, who is in charge of glass research with the Research Section of the National Historic Parks and Sites Branch, Department of Indian and Northern Affairs, Ottawa, for references, discussion, and help; and to G.B. Hares, Senior Research Associate, Glass Chemistry Research Department, Corning Glass Works, Corning, New York state, for references.)

The only other reference to pipeclay in connection with glassmaking known to this writer occurs in an C18 encyclopaedia (Anonymous 1771: s.v. Glass) which notes that while English glass-furnaces were made of "sandy stones" and never of brick, French glass-furnaces had an outside of brick "and the inner part, to bear the fire, is made of a sort of fuller's earth, or tobacco-pipe clay, of which earth they also make their melting-pots" (by the beginning of the C20, by contrast, fireclay was being used by glassmakers for kilns and crucibles, according to the 1910 edition (the 11th) of the Encyclopaedia Britannica (vol 12 pp89, 90)). This 1771 reference may conceivably be the source of Chalkley's contention - Chalkley was always secretive about his sources, and frequently inaccurate (cf p.224 above) - but if so the reference specifically does not apply to England and gives no reason why a pipemaker should adopt glassmaking techniques any more than they should adopt pottery techniques from potters also using pipeclays (what technical aspects of the various trades were supposed to have been adopted Chalkley nowhere states). Indeed, perhaps a more curious feature is the relative rarity, prior to the development of large firms with varied interests in the C19, of connections between pipemakers and potters (Oswald 1970b: 236, cf 236-9; cf also Alvey 1973: 38 and Oswald and Hughes 1974: 142-3, 170, 169 for instances in Nottingham and the Chesterfield area and

Douch 1970: 58; 1971: 146 and passim for instances in Cornwall); and it is significant that at the potting community founded about the middle of the C15 at Potovens, near Wakefield, pipemaking families remained specialists among the potting families, in one case continuing in the trade from the mid-C17 to the mid-C19 (Brears 1968: 42, 40, 13; cf Butler in Lawrence 1974: 189).

Bell-making certainly made elaborate use of clay (there is a convenient summary of the process in the 11th edition Enclyclopaedia Britannica vol 3 pp687-8), but while the type of clay used is not stated there is again no reason why the use in common of certain materials by different trades should indicate that one trade derived part of its technique from another. The fact that Knight in the second half of the C19 refers to pewterers using brass or copper moulds to produce plates and dishes offers no reason to suppose that pipemakers, who also used moulds, should have had any intimate trade association with them. The reference to family connections between brass-moulding and pipemaking is of some interest, because as Oswald notes (1970b: 225), the use of metal moulds in pottery - aside from use in statuettes and applied motifs - did not come into use for everyday ceramics until the C18. However, it seems to this writer that the reasons pipemakers used moulds was probably the same as caused statuettes and applied reliefs to be so made: the items were sufficiently simple and small to be moulded. A clay tobacco-pipe, after all, is a very unsophisticated idea.

Pipemaking has a number of connections with several other trades which do not involve any suggestion of exchanging technical traditions. Parsons (1964: 235-6, 235) notes a strong connection between pipemakers and innkeepers in NE England and also pipemakers and grocers. The former connection has been noted elsewhere (T.P. Cooper 1907: 104-5; Lipson 1931: 282, 1956 ed; Atkinson 1965c: 95 n.12, rev ed 1969b; cf 2: VII), together with references to bakers and cooks making pipes in London in the mid-C17; and is a reflection of all three occupations using large fireplaces or ovens and in the case of the innkeeper having available a convenient clientele to buy the products. Fulfilling as they always have done the role of community or social centres, it is likely that public houses were major centres for the use and distribution of clay pipes from the introduction of smoking: as already noted, pipes bearing marks which possibly represent public-house signs are known from London as early as the first quarter of the C17 (Atkinson and Oswald 1969: 189 and 192, 191 fig 7), and similarly-decorated pipes are known from Chester in the earlier C18 (Webster and Barton 1957: 19-20) and from London last century (Atkinson and Oswald loc. cit. and 201). Certainly public houses were important markets for pipemakers by the C18 (Chandler 1957: 333 citing a source of 1706; R. Campbell 1747: 326-7, 1969 ed.) and continued to be so in this century (Anonymous 1856a: 92; Fairholt 1859: 179 n.; Christy 1907; M. Phillips 1918: 166; Fleming 1923: 237; Hermessen 1926: 325; G.C. Spence 1942: 57, 53, 60; G.E. Evans 1960: 82, 1967 ed; I. Knight 1961: 34; Daniell 1965: 61; J. Peterson 1968: 13; Hallgarth 1969: 34; P.K. Wells 1970: 21).[26] An interesting indication of the position of public houses on pipe use and distribution is the occurence on the sites of two contemporary inns at Caerleon of pipes in the one case from Broseley and in the other from Bristol, in the C17 (J.M. Lewis 1967: 106). The association with the grocers reflects a convenient method of marketing. Parsons also notes (1964: 235) an association of pipemaking and trunk-making in York, an association which does not appear to have an obvious explanation.[27] Connections noted in the C19 between pipemakers and the manufacture of whiting, distemper, and putty (Atkinson 1966: 276 n.2, 272, 273, 275; Triggs 1970 and C. Green 1973a; Cooksey MS 1)existed because of the use of pipeclay in the manufacture of these items.

In the C17 in Bristol, Thomas Monkes is recorded in 1656 as being a pewterer taking an apprentice to teach him pipemaking, though when he took another pipemaker-apprentice in 1669/70 he is noted only as a pipemaker; and in the 1630s Samuel Lewis is described sometimes as a smith and pipemaker, sometimes only as a smith, John Casy is described as an aquavitemaker and pipemaker, and Samuel Morris as a saddler and pipemaker. The reason presumably is either that initially pipemaking did not offer a good enough living in itself or else that these individuals, already set up in their original business - in each case pipemaking is listed second - branched out into pipemaking as smoking became rapidly more popular. The overall evidence - certainly the Bristol evidence - suggests pipemaking, at least until diversification of industry in the C19, was a specialist craft on its own, owing little to other trades.

Care should be taken not to read significance into fortuitous associations: H.J. Powell notes (1923: legend on map facing p.92) that Ratcliff in East London was the centre of the bottle industry in mid-C18 London, and Ratcliff and East London in general was a pipemaking centre; but the connection is surely simply that East London (as noted in 4: VI) was an intensely industrial area, full of small crafts, and that pipemaking, bottlemaking, and many other trades flourished side by side without any special significance. Certainly this writer has found no connections between Bristol's famous bottle- and glass-making industry and its pipemaking industry: for example, out of 347 pipemaker apprentices recorded in Bristol only two were glassmakers' sons (see 6: III).

The production of to make effigy bowls and other stub-stemmed pipes follows a somewhat different process to that used for ordinary clay pipes. McDougall's used kaolin for their effigy bowls and expressed surprise that Pollock's were able to use ball clay successfully. The simpler effigy pipes can be made with a normal two-piece mould and come with a standard stem (FIG 108 centre row, left and second from rt), but normally a three-piece mould is used and the pipes have a thick upwardly-curved stub stem to which a downwardly-curved vulcanite mouthpiece (the same type as used on brier pipes) is fitted. As the bore of the stem stub has to be wide at the stub end in order to take the vulcanite part, it is made not with a wire but with a curved and pointed metal implement, called a "poker" by McDougall's (cf reference in Anonymous 1900: 5) and a "bodger bar" by Pollock's (FIGS 113-114). The pressure from the stopper inserted into the bowl forces clay around the poker, thus forming the stub stem. A lump of clay is therefore frequently used instead of a roll; again, the amount of clay has to be judged by experience.

McDougall's positioned their poker so that it made the hole through to the bowl without the stopper hitting the poker point, but Pollock's, after the moulding, use a "borer" - a short, relatively thick "wire" (with a widened end) to push the bore through.

The third part of the tripartite mould contains the facial features (FIGS 116-117), so that the mould lines are thus not down the middle of the face but down either side by the ears. These mould lines are carefully trimmed so that the joints were invisible at a casual glance. The most delicate part of the work was what McDougall's called "scouring" - cleaning with a sponge - the face without marring the subtleties of the cheekbone modelling or the eyes, preparatory to varnishing the outer surfaces with shellac.

Daniell (1965: 60-1) describes the process of manufacture used by a native of Broseley, William Flanagan, who came to Leicester ca.1885 and manufactured pipes until 1919. The information came from Mr Flanagan's son, and as can be seen the processes used were very much more primitive than those described for other C19-C20 makers.

The clay was brought by cart and the lumps stacked in the yard of the house, the manufacturing being done in the Flanagan home. The clay was beaten until it was "mushy" and then rolled out flat, like pastry, on a table. It was then shaped into rolls and a length of wire threaded through each roll to form the bore. The end to be the bowl was then turned up and the blank put in a bipartite mould. The bowl was then put in a wooden vice called a "ginhead", and the metal "stopper", which hung from a cord from the roof, was plunged into the mould to form the bowl and connect with the wire in order to "make the draught". The wire was then withdrawn, the mould opened, and the pipe removed. The pipes were then put on racks to dry before "trimming".

The firing was always done at night, in a bee-hive shaped kiln. One side of the kiln was demolished after each firing in order to remove the pipes and prepare the kiln for the next firing. The pipes to be fired were placed against a central column of fireclay to form a pyramid with the bowls facing outwards. In order to keep the pipes in this position and for them to retain the heat at a very high temperature they were wrapped in old playbills collected from local theatres and the paper pyramid thus formed was covered with a mixture of clay and horse manure. The fire was lit and the kiln bricked up. (Unfortunately, it is not clear where the fire was, nor why it was lit before the kiln was closed.) Firing normally took from eight to ten hrs; when the fire had been allowed to go out the pipes were left to cool for five or six hrs.

All this work was done by Mr Flanagan himself, though his wife was able to help him; the remaining work was done entirely by Mrs Flanagan. She packed the pipes between sheets of paper in a large wickerwork basket and left early in the morning to sell the pipes, mostly to publicans who kept a supply in order to give them out free with drink and food. These were the cheapest pipes, and were sold to the innkeeper for 9d a gross. The people who bought them were chiefly local miners and coalmen.

Because of particular preferences, a varied selection of moulds was necessary. The very long pipes - 21-ins, 18-ins, and 12-ins - were in fair demand as late as 1914. One pipe mould with an elaborate bowl needed a three-piece mould: pipes made from it were sold wholesale at 6s6d a gross, and retailed at 2-1/2d each.

The description of Flanagan's business gives us a picture of the primitive working conditions and drudgery of the pipemaking trade and enables us to visualize earlier working conditions, for it is clear that Flanagan's methods derive from an earlier period. His was a small and struggling family business; there was none of the luxury of specialized employees to do the various parts of the manufacturing process such as there was in C19 and C20 factories. Flanagan was apparently unable to afford the head and handle to speed up manufacture; instead he had to insert the stopper by hand, which must have made production a long, laborious grind. The term "ginhead" was apparently transferred, rather curiously, to the press. His kiln too was primitive, having to be dismantled after each firing was over and rebuilt before the next firing, and he was apparently unable to afford the standard fireclay saggars.

We have here a picture of what pipe manufacturing must have been like generally prior to the end of the C18, for with the possible exception of a few manufacturers who were able to set up a large concern - such as the Robert Tippet family of Bristol in the latter part of the C17 and the earlier part of the C18 - earning one's livelihood by pipe-making must have been a lifetime's grind of hard work, long and (especially during firing) irregular hours, alternately affected by damp when mixing the clay, heat when firing, arduous work dismantling and rebuilding the kiln, painstaking work in trimming the pipes.

That a maker's wife assisted him, as did Flanagan's, is indicated by a number of instances of the widow continuing her dead husband's business and taking apprentices. J(o)ane Tippet, widow of the first Bristol Robert Tippet, continued to make pipes and take apprentices for at least a decade after her husband's death, and although she and her son Robert jr (who became free in 1678) used almost identical moulds and marks and therefore probably had some amicable agreement, the mother apparently remained independent and a pipemaker in her own right. The number of journeymen and apprentices a pipemaker might have would depend on guild regulations at least until about the end of the C17, after which time guild legislation was becoming increasingly a dead letter (e.g. F.H. Rogers 1949: passim; also 6: II); but the six workers noted by Houghton at the end of the C17 (Houghton 1693/4: 205) probably represent the strength of an average establishment - perhaps two journeymen, a senior apprentice, and a junior apprentice in addition to the master and his wife.

A number of allegedly contemporary accounts of pipemaking in Britain in the C19 are known to the writer, but all are brief. One (Porter 1832: 99-103), some 60 years after Diderot, presented a summary - at times a direct translation - of this account with added opening and closing paragraphs implying that this was how pipes were being made in England in the first half of the C19 (the clay used, he says, comes from Purbeck in Dorset). Porter gives no acknowledgement as to source, though in addition to the text he copies - in one case inaccurately - several of the Duhamel du Monceau-Diderot illustrations. One drawing he appears to have obtained from some other source. In the middle of the century one encyclopaedia

(Tomlinson (ed) 1852-4: II, 450) translates Duhamel du Monceau and uses his illustrations (and the inaccurately-reproduced one used by Porter), though the source is acknowledged and described as having "served as the text for most writers on this subject up to the present day" (he also appears to be quoting Brongniart). However, like Porter, he is guilty of leaving his readers with the impression English pipes were made this way. He too notes that the clay used in England comes from Purbeck. As late as 1911 the second, "revised", edition of Bourry (1897: 337-9, 1911 ed) describes pipemaking in what appears to be a mixture of Duhamel du Monceau's and Ure's (see below) accounts: the mould and stopper described and illustrated belong to the former, the making of the blank in two pieces and the muffle-kiln to the latter (though saggaring is noted as an alternative). Other writers or encyclopedia - and dictionary-compilers - e.g. E.H. Knight 1876: 2583-4 - are so brief in their description that they add little if anything to the account.

Another account, based on a visit to a factory near Whitechapel Rd, appears anonymously in an issue of Chambers' Journal in 1856 (Anonymous 1856a: 92) and is repeated, together with an illustration of a mould and head and handle and additional comments on them incorporated into the text, in Fairholt (1859: 176-8). Here, it is stated that pipeclay came principally from Purbeck - that is, the Poole area - in Dorset. (Poole was (cf Willan 1938: passim, 1967 ed) the principal supplier of clay for pipemaking throughout England from the beginning of the C17 at least the earlier half of the C18; see also Section IX below). The clay was broken and pounded with a rammer and mixed with water. When at a requisite consistency it is formed into long-tailed lumps. These are then taken by the moulder who threads them over a fine steel rod, the latter being "in the exact centre of the clay for the whole length of the pipe." This is then put in one half of the two-piece mould and the other half put over it, pins in one half fitting holes in the other. The mould is then put in the "press", which Fairholt appears to use as the term for the entire piece of equipment, including the head and handle (the head is referred to as a "strong beam"). The vice has iron plates. The handle is then brought down to push the "projecting rounded cone" into the bowl of the pipe, and when this is removed the superfluous clay is cut from the top of the bowl with a "knife", there being a slot near the top of the mould for this. (This part of the description is largely Fairholt's addition, and while accurate enough is probably not taken from direct observation otherwise the "projecting rounded cone" would probably have been given its technical name of stopper.) The pipe is then removed from the mould and passed to the trimmer, generally a women or a young boy. A "sharp steel instrument" is used to trim off the mould-line; the bowl is then "dressed to a neat shape", the mouthpiece cut smooth, the steel rod removed, and the pipe blown through before being placed on a rack to dry before firing.

This account appears to be standard, though the wire used to make the bore of the stem and the finisher's wire appear to have been thought of as one. Duhamel du Monceau notes that in northern France pipes were blown through after firing - blowing through them before firing, as noted here, may be another telescoping in recording, but it makes better sense in that flaws could be caught in time to be easily corrected, and by the time the pipes were dry enough to be trimmed they could be blown through. The slightly earlier account noted below also says the pipes were blown through at this stage. It is not certain what precisely is meant by cutting the mouthpiece smooth, as this normally appears to have been formed by the mould, but the source to be next noted also mentions this and it seems likely that it is a feature used especially in France and Germany (Pollock in litt. 14 March 1968) to finish off a moulded mouthpiece as indicated in FIG 117. (Duhamel du Monceau notes that the mouthpieces of French and Dutch pipes were trimmed after the moulding process, though not to form a mouthpiece of the type illustrated.) The head and handle is illustrated by Fairholt, though with a symmetrical stopper. This later is probably a generalized depiction by an artist, and is probably from Good, Gregory, and Bosworth (eds) 1813: pl 138.

A similar account, also anonymous, appeared about the same time, in 1852 (Anonymous 1852). The writer has a blase and condescending style, but describes the process in fair detail. The only part where he is vague is the moulding process - after the "tadpole" had been put in the mould it was "pressed", but there is no description of the press or how it worked. In other respects the description follows the general pattern described previously, including a reference to blowing through the still-unfired pipe. After trimming it is noted that the mouthpiece was cut even.

A brief account of pipemaking in the extremely poor area of St Jude's, where the C19 Bristol industry concentrated, appears in 1850 (anonymous contributor to the Examiner, 17 August 1850) and gives a valuable picture of the industry there at this time. The workers were mainly women employed in the various factories of the area. The woman whose work was described, however, apparently worked at home and sold to the factory, and had taken to pipemaking on the death of her husband to support three children still at home. Because she was not strong enough to be very expert (and also perhaps because she was less experienced than others longer in the trade) she produced only 9 gross a week or 1-1/2 gross a day (her gross was 180). Apart from paying a man to prepare the clay, she did all the work - rolling, moulding, and trimming - up to the firing stage, an indication of the attenuated state of an industry unable to afford specialist trimmers.

A ball of clay, its size estimated from experience, was taken in each hand and two rolls made, their bowl ends being larger than the stem. These were set aside to dry and harden in dozens, then "wired" (the term recorded). The next part of the description has apparently been slightly confused and compressed, for the reporter then notes that when the pipe was at the proper "temper" (the term he records) it was put in the mould, whereas in fact there cannot have been any further drying between wiring and moulding as this would imply. The observer then says the two parts of the mould were brought sharply together with a lever and this forms the pipe. In fact presumably the mould was closed in a vice and the lever was the handle which forced the stopper into the mould to form the pipe. This the pipemaker described as "hard work for a woman". After this the wire was withdrawn and the pipe smoothed or polished with a piece of iron (no mention is made of using a trimmer's knife). It was then ready for firing.

An account of 1832 (Weld 1832: 510-14) describes pipemaking at Knockcroghery near Roscommon in west-central Ireland. Both the business and the products appear to have been rather primitive. The clay, which came from a source some two miles away, occurred in irregular beds at varying depths resting on limestone gravel, and frequently contained large pebbles and occasionally fragments of sandstone. The clay was examined and washed, made by hand into small cakes, and dried in a "sort of stove" or near the kitchen fire. When the correct dryness was reached the cakes were broken into a fine powder, sieved, mixed with water, and "prepared for use". From this clay rolls were made, two at a time, by the moulder (this is the term Weld uses) and put in bunches of half-a-dozen each. The rolls were then wired and put in the mould.

The mould was then placed in the chest, which was wooden but lined with iron, and closed by a screw with a wide thread which enabled it to be rapidly closed by a handle "like that of an augur." A head and handle was used to form the bowl, the stopper being referred to as a punch, and after this "the pipes are passed in the usual process through the hands of the finishers, and finally are packed into the burning kilns, which hold about 140 groce each."

The writer comments that women were not allowed to do any work "excepting in some very slight and unimportant parts of the process", apparently because the journeymen on whom the business depended refused to allow them to be employed. The writer notes that in pipe-factories he had visited in The Netherlands women were used in different branches of the work, and also that there boys were used to roll the pipes, leaving the men free to concentrate on moulding. At Knockcroghery the "filling, pressing, and discharging the mould" was done five times in two minutes, and Weld said that a moderately steady moulder could turn out seven to eight gross a day "during the ordinary hours of working; but more might be done by exertion."

There were about eight kilns in the village, rather less than that number of masters, and about 24 journeymen moulders. The average production was ca.500 gross a week, though occasionally 1,000 gross was reached, a figure which had been the average production some years previously. They were sold for 1s a 12-dozen gross though formerly they had been sold at 2s6d a gross. The size and shape of the pipes were poor, and considered so even elsewhere in the county; their chief use (because of the smallness and cheapness) was at wakes. They were generally packed in small crates and bought by pedlars who hawked them round the countryside.

The moulds, which were locally-made were, however, praised for their workmanship - they were made by country smiths from iron and steel, but the pipemakers did not order sizes and shapes to satisfy town preferences. The iron moulds cost ca.25s a pair (probably this means the two halves) and lasted for several years; the vice screws lasted only about two years before repairs were necessary.

Several C19 encyclopaedia-entries may be grouped together as they have a number of similarities, particularly regarding their description of the firing process. These sources are Good, Gregory, and Bosworth (eds) 1813; Rees (ed) 1801-20; Hebert (ed) 1850; and Ure 1848 ed.

The first of these states that the clay used came from "Maidenhead, in Kent" (this appears to be an error, for neither Bartholemew's Survey Gazetteer of the British Isles, 9th ed 1966 reprint, nor the Census 1961:

England and Wales; Index of Place Names L-Z (1965) lists a Maidenhead in Kent; nor is Maidenhead in Berkshire known as a clay-producing locality). Lumps of this clay were purified by being disolved in water in large pits, the solution being well stirred and then poured into another pit where it settled and the water was run off. The clay was then beaten with an iron bar. The manufacturing process follows the standard sequence, although the wire is recorded as being withdrawn before the pipe is taken from the mould. "Curved scrapers" were used to remove the mould-lines and the pipes were then polished and smoothed by a piece of hard wood with a semi-circular groove.

The firing method described is the earliest description so far found by this writer of the use of a muffle-kiln in England for pipemaking. The kiln was of brick, with a firebrick lining. The muffle, standing free of the kiln walls, was made of broken pipe-fragments cemented together with fresh clay and hardened by firing. It is referred to in the text as the "pot or crucible". On one side there was an opening for loading the muffle which was closed with a similar mixture of pipe-fragments and clay. Inside the muffle were ledges to hold the bowls of the pipes to be fired; the stems rested on "circular pieces of pottery which stand on small loose pillars...set up for the purpose in the center [sic]." In firing the temperature was raised slowly and held for seven to eight hrs; the cooling was effected by closing the vent at the top of the firebrick lining with a flat plate of fireclay, from which it appears that the fire was allowed to extinguish itself from lack of oxygen.

Rees's description of the manufacturing process follows very closely that given above - although the source of clay is noted as being the Isle of Purbeck - and may well be a copy or from the same source. However, a much more detailed description is given of the kiln, which is again a muffle-kiln. By way of an apology "for introducing into our plates the implements of so trifling a manufacture" the writer draws attention to "the ingenious structure of the furnace, and the application which may be made of it to other and more important purposes" whch suggests that perhaps hitherto the muffle-kiln was not widely known, at any rate in England.

The muffle, as in the previous description, sat above the furnace and was separate from the kiln walls. Again, it is called the "crucible, or pot". Its base was constructed from pipe-fragments radiating from the centre; these were coated with a layer of clay at the circumference, pipe-bowls were inserted into the clay, and in these other pipe-fragments were placed upright to form the sides of the muffle. The lower part of the entrance to the kiln was kept permanently closed with an iron plate plastered with firclay, and the upper part, through which the muffle was loaded, was closed with brickwork; the corresponding opening in the muffle was blocked by spreading a layer of clay round its edges, laying stems of broken pipes across, and plastering this with clay in the manner of lathe and plaster work. The ribs which attached the muffle to the inner kiln wall were similarly made of pipestems covered in clay. The virtues of a muffle such as this were its strength combined with lightness, and the small amount of clay used. As with the previously-described kiln, several - six in this case - small ribs ran round the inside of the muffle at intervals to take the pipe-bowls so that too many pipes would not lie on top of each other and crush the bottom layers. In this manner 50 gross - 7,200 - pipes were accomodated. They were fired for from seven to nine hrs, the heat at first being increased only gently. The fire was regulated by a kind of damper covering the opening in the fireclay lining of the kiln: this was a sheet of coarse brown paper covered in a well-worked mixture of horse-dung, sand, and pipeclay.

Talking of crucibles used in furnaces in general, Rees notes that formerly the only good ones were those from The Netherlands and those called Hessian crucibles (cf Staal 1957: 46-8) - a remark to be noted later referring to Dutch-style saggars being used in the pipe industry may be an echo of this. To prevent cracking with extremes of temperature, which would happen to crucibles made purely of clay, a coarse powder made from fired clay, or sometimes pure white sand (metallic oxides, especially iron, had to be avoided) was added.

The third of the sources Herbert, noted is merely a resume of the above, both in its description of the manufacturing process and of the firing in a "pot" or muffle (Teignmouth in Devon is given in addition to Purbeck as a source of clay).

The fourth source, Ure, is in many respects similar in content to the preceding, but has some additional observations. The clay is noted as coming from the Isle of Purbeck and from Newton Abbot. It was worked with water to a fine paste, then either left to settle in pits or passed through a sieve. The water was then evaporated (by what means is not stated) until the clay was of a doughy consistency, when it was kneaded. It was then ready for use and a child made the blank in two parts - a cylinder for the stem and a lump for the bowl, which was added to the cylinder. After being set aside for a day or two to reach the right consistency the blanks were taken to the "pipemaker" who used a folding brass or iron mould. (This implies a hinged mould, though this writer has never seen one: G.B. Hughes (1961b: 1934) refers to hinged moulds, but he is an unreliable source, while Berry talks of hinged moulds but illustrates conventional ones (1963: 3, pl XI, also pls LX-X).) The rest of the moulding was standard, though it is said that only the end of the wire was oiled - again, the wire was removed before the pipe was taken from the mould. The finishing process, however, was divided into two in a manner reminiscent of the present Dutch process, the excess clay being removed with a knife when the pipe had been taken from the mould but two days' drying being allowed before it was "scraped [and] polished with a piece of hard wood". A workman and a child (presumably working as noted above) could easily make, it was said, five gross pipes a day.

The description of the kiln follows that in Rees, though the muffle is called here a "crucible, or large saggar" (the firing time given is 8 to 12 hrs).

There are certain points in the description which suggest one cannot accept Ure's account unreservedly - this writer still cannot see that making blanks for the bowl and stem separately was a practical method for making pipes, and Ure appears to imply that meerschaum pipes are fired the way clay pipes are, which is certainly untrue, though meerschaum when dug from the ground is normally quite damp and is dried for several weeks in low-temperature ovens prior to going for manufacture into pipes (Weber 1962: 25-7). The great difficulty with all encyclopaedia descriptions is to know how much has been uncritically rehashed from other sources, some of which may relate to another country and period and may themselves be second- or third-hand conflations (cf Celoria 1973: 11, 20ff). In particular, points such as whether blanks for bowl and stem were made separately or whether the wire was withdrawn before the mould was opened or after are not resolved because a series of encyclopaedias all repeat certain assertions (a point forgotten by some researchers - for scathing observations on this by Housman, written in his usual exhilarating manner, see J. Carter (ed) 1961: *passim*).

However, the descriptions in these four sources of the muffle-kiln used explains the fragments of what appears to be pipeclay with stem- and bowl-fragments in or on them which have been found on several pipe kiln sites but for which an explanation has so far not been found. These sites are discussed below.

A rather curious account of manufacture occurs in another C19 encyclopaedia, that published by Charles Knight of London (C. Knight [28] (publisher) 1851: 1702-3; repeated in Brabner (ed) 1884-88: cols 945-6). The clay is described as coming from Purbeck in Dorset and the description of the first part of the process is conventional enough, though compressed as always; but in the moulding process the bowl is described as being partially hollowed out with the finger and completed by the insertion "of an oiled stopper or mould [sic]". The most remarkable part of the account, however, concerns the trimming process. After moulding the wire was withdrawn, the pipe taken out of the mould, and the pipes "slightly smoothed over, and laid aside to dry". After drying for a day or two, the account continues, "any remaining roughness is removed by means of an instrument of bone or hard wood, and then the pipes are sometimes moulded a second time, and polished with a piece of flint bored with holes, through which the stem is passed repeatedly". Firing was done in what from the description was a muffle-kiln, the pipes being placed with their bowls against the muffle wall and their stems supported on "circular pieces of clay set up in the centre". One such "furnace", as the writer calls it, could hold "fifty gross, or 7,200 pipes" and firing time was eight or nine hours.

The origins of the peculiar trimming features noted here is unknown to this writer. The use of a finger to partly form the bowl and the two-part finishing process appear to indicate information from Dutch or French pipemaking, and a bone or wooden tool to smooth the stem is quite possible, but the piece of flint with holes bored through it with which to finish the stems has no parallel in this writer's experience and frankly sounds an extremely unlikely tool, as well as one whose use would take an amount of time unacceptable to the maker.

By the time Penn (1901: 164-5) was writing, all the clay used was said to come from Newton Abbot and Kingsteignton in Devon, from where it was sent to all parts of the world in "rough lumps, about the size of quartern loaves, weighing some 28 pounds each". In the factory the lumps were dried because clay absorbs water only when crumbling, then moistened, worked with a spade, and beaten with an iron bar until the consistency of putty. Masses of from 80 to 90 lb (which sounds very large) were served out to the pipemakers, who took the relevant amount of clay for the size of pipe to be made. The rolling process as described by Penn is unique in that the pipemaker used "boards fastened to the palms of the hand", though as already noted Pollock's sometimes use a board to finish rolling and McDougall's used a board on certain types of pipe. The rolls were then set aside to dry for ten hrs, then pierced and put in the mould and shaped. The pipes were then set aside to dry for another ten hrs before being trimmed, a job done by women with a "curved metal burnisher". After a day or two's natural drying they became "'chalk-white'" (a term Penn puts in inverted commas and which may thus have been a technical term) and are then ready for firing in saggars. They are fired for 7 or 8 hrs, and another 12 or 14 hrs are allowed for cooling. Unfortunately the source of this account is not given - Penn's closing remarks about the quantity of pipes fired at one time, now and compared to earlier times, and the very small rate of breakage in modern firing are borrowed from R. Thursfield (1863: 81) or E.T. Stevens (1876: 108, 110).

I.J. Williams, discussing the products of the Nantgarw porcelain, pottery, and pipemaking factory near Cardiff, gives (1932: 140-3) an account of pipemaking which one might assume to represent the methods used at that factory, which concentrated on pipe manufacture from 1833 until it closed in 1920. However, there is internal evidence that Williams tended to use typical or standard accounts to illustrate his paper when direct evidence from Nantgarw was lacking. For example, it is not clear whether his fig 6, a cross-section of a double updraught kiln, depicts the actual kiln at the pottery or not - it looks as though it might have been taken from an encyclopedia, and does not agree in detail (for example, roof slopes) with the kilns on the site illustrated in his figs 3 and 4. Fig 7, designed to show the heel of a pipe, is an illustration of a later C17 Broseley pipe (although Williams does not mention this) and is neither typical of heel pipes generally nor in any way connected with Nantgarw pipes. Fig 8, illustrating the stacking of saggars, is an illustration supplied by the Wedgwood firm, as the caption notes: it therefore presumably depicts saggars of pottery, so that to use it as an example of saggars of pipes (p.140) is misleading. In the account of pipemaking it is not actually stated that this was the method used at Nantgarw, and it is perhaps significant that it is not until production rates are noted (p.142) that a retired employee of the firm is quoted (he may also be the source of the wholesale prices for pipes, of the source of the clay used, and the source and price of the coal, all of which follow immediately (pp142-3).)

In any event, the account of pipemaking is brief but does include one problem. Williams says the stem and bowl were made separately. This assertion has been examined in detail when dealing with manufacturing in France (see above) and this writer is reluctant to accept this statement, believing it may have originated in a misreading, perhaps by Brongniart in the mid-C19 or perhaps earlier, of Diderot's resume of Duhamel du Monceau's monograph on pipemaking, reinforced by an enigmatic set of illustrations in Diderot apparently showing this method of pipemaking but unrelated to the Diderot article on pipemaking and unknown to Duhamel du Monceau. When

Williams talks about the clay escaping from the two parts of the mould when closed, he says that the clay is forced not only through the slot near the mould which takes the trimmer's knife but also through "escapement areas" which he indicates unclearly in his illustration (Fig 25 btm): in fact he appears to mean simply that clay escapes along the line where the mould faces meet, and this curious description suggests he is not familiar with the pipe-manufacturing process. Otherwise his description is accurate enough; the clay both for the pipes and white-bodied earthenware also made by the firm came from Newton Abbot in Devon.

In the saggars Williams says the pipes were laid with the bowl lying towards the outside and the stems to the centre resting on a clay block, and the saggars were then placed one above the other. The firing had to be carefully regulated to ensure the pipes remained porous; mouthpieces were varnished "invariably" a bright red or a grass green colour. At Nantgarw there were three kilns (pp112-6). One was for producing bisque porcelain, another was for glazing it, and the third was a two-storey updraught or multiple kiln (a type Williams says is common in Continental porcelain factories) which was used for firing the pipes among other items. In the lower chamber or storey the pipes were fired; in the upper, small varieties of pipeclay pots also in saggars. The entrances to both floors were closed and firing was done by one ground-floor set of fire-holes. Williams notes (p.116 n.1) that he obtained this information from the descendents of W.H. Pardoe who had owned the pottery from 1833 until his death in 1867; these descendents still lived in a house on the site. Coal, costing 15s a ton from Pwllgwaun Colliery, Pontypridd, was the fuel used (p.143).

According to a retired pipemaker with the firm, his output, when his wife and daughter assisted with cleaning the moulds and trimming the pipes, was 60 gross of 14 dozen each - just over 10,000 - which was about the average number which could be fired at one time in the kiln. Assuming a six-day week, ten gross or 1,680 pipes would have been produced daily, an amount which sounds extremely high (see 6: I).

The mention once more of the alleged production of bowls and stems separately makes this a convenient point to note a peculiarly bizarre method of production claimed by Harley (1963: 13) to be used for "making pipes by hand". The stem, he avers, is made "by rolling wet clay around a steel wire, which, projecting into the bowl to which the stem is affixed with slip, serves to keep open the smoke-passage." This appears to be the same extraordinary method described in an appendix to Diderot and discussed on p. 90 above; as stated there, wherever the Diderots obtained this account, it is quite impossible that clay tobacco pipes could have been manufactured by such a method.

An illustration shown in Hughes (1961b: 1934 fig 4) and said to date to ca.1820 depicts certain apparent variations in pipemaking otherwise unknown to this writer. One workman is shown rolling out a long-stemmed pipe in the Dutch fashion, i.e. with both hands forming the one roll. The wiring is shown in the orthodox manner, but the moulding process appears very strange. One man is holding up a rectangular plate which is apparently one half of a matrix for moulding three pipes (in this case moderately short-stemmed examples) simultaneously, while another similar plate for moulding two pipes together lies on a table. This latter appears to be fitted with a lid hinged to one side of the plate. In the background is a brick kiln or drying chamber, in two vertically-positioned openings of which are pipes loosely packed and standing on their bowls; this structure may be for stoving rather than firing as a saggar, in the form of a tall footed basin, lies in the foreground of the illustration, its pipes stacked conically with bowls at the bottom and the stems held together with a ring of some material, perhaps pipeclay as at Pollock's.

It is difficult to know how to judge this depiction. The style of the illustration is certainly primitive, and it is difficult to believe the moulding process has been shown accurately - for one thing, it is totally unclear how stoppers could have been inserted into the mould-plates shown and if they could have been inserted this method of production would have almost certainly have been more complicated and slower than the conventional method of production.

In a brief description of pipemaking in Colchester in 1906, Benham (1906) as observed above notes that Joseph Jennings, the last Colchester pipemaker - he had ceased work between 1907 and 1910 (Christy 1907; Gant 1959a: 4) - fired his pipes in a "closed coke-heated muffle...[for] some five hours". As noted below, archaeological evidence for a muffle-kiln elsewhere in Colchester comes from the earlier C18. The Jennings reference is the only one known to this writer where coke is used; the five hrs recorded for firing seems unusually short.

John Frederick Bryant jr, the Bristol pipemaker of the late C18 already mentioned, refers (1787: xxxiii) to his eyes being affected by the glare from the kiln fires, which possibly suggests the pipes were fired in something like an oven or an open fire rather than a true kiln, though Bryant does refer to kilns. He specifically noted (loc. cit.) that the firing process was called "burning" the pipes. To judge by complaints in 1664 (T.P. Cooper 1907: 104-5) that bakers and innkeepers were making pipes, and other evidence to indicate this (e.g. Cassidy 1895: 18; Oliver 1948: 151-2; Parsons 1964: 235 and 237), an oven could be used instead of a kiln for firing pipes.

The 1727 inventory of a deceased Arundel pipemaker, William Artwell, includes two pairs of screws and moulds and boards and "greats", together worth £3 5 6; two benches and a tub valued at 3s; and a beating block, trough, hogshead, firepan, and poker totalling 6s (G.H. Kenyon 1958: 106 and Atkinson 1972e: 39), while a similar inventory of 1671 for a deceased Spalding maker, John Fox, included three pairs of "skuers" (screws?), six pairs of "mowls" (presumably moulds), "4 doz of grates and mowles", a table, three benches and another listed separately, two chairs, six hooks, a "beaking" [sic - beating?] trough, and a block (P.K. Wells files). The screws are the chests of the modern industry, and the boards listed among Artwell's equipment could either be the shanking or dozening boards or the drying boards. The various benches, troughs, tub, and blocks are all straightforward equipment used in preparing the clay and producing the pipes, and the hooks listed among Fox's material may be the tool of that name noted earlier (and also below, when discussing Holme's catalogue of pipemaking tools) but what the "greats" or "grates" are is totally unclear.

Particularly perplexing is the entry in Fox's inventory of "4 doz of grates and mowles" immediately following an entry of "6 pr mowls": the whole Fox inventory is filled with obscurities of spelling, and while 6 pairs of moulds is a reasonable number, several dozen more seems unlikely in the extreme (unfortunately values are not listed). If the Fox entry can be relied upon, its entry would suggest "grates" were specific items rather than a mass of material. Tantalisingly, "grates" are referred to in a poster advertising the sale by auction of the "stock, plant and utensils" of the business of Ebenezer Church of Pentonville, London, as late as 1894 (original poster in possession of Miss E.J. Church, copy in this writer's files). Here, after listing "moulds, benches, ginheads and screws, seggers [sic], vices", followed by some equipment not specifically connected with pipe-manufacture and 1,000 gross pipes, the advertisement ends noting a "quantity of useful effects, such as grates, boards, &c.", the last three words appearing in large thick capitals. In the lots listed below the advertising lines appear as numbers 8-11 and 14 the following:

20 10-in. grates
48 15-in. ditto
36 ditto ditto
4 18-in. ditto
24 old boxes and large grate

which frustratingly leaves the actual identity of the items as obscure as before.

An obvious suggestion would be that they were simply firebox grates, which would have been made of metal and therefore of some value, and the term was certainly used for these in the early C18 (see p.414 below); but how many kilns would there have to have been to utilize over 108 of them, and why should they have been of different sizes (whatever the various sizes listed actually do mean)? Even Fox's business, as noted above, had four dozen "grates and mowles", and his enterprise certainly cannot have been a large one. It is certainly difficult to see what wooden gratings would have been used for, except perhaps for standing above water when mixing clay, but again why so many and why the differing size? One speculation by this writer, that the term was used to refer to what Dutch pipemakers called gruys (modern gruis, grit) - ground and sieved fired pipeclay used to bed the pipes in the saggars preparatory to firing - seems certainly to be wrong (the idea was that with the known English origins for a number of Dutch pipemaking terms and English term "greats" or "grates" might have existed for this grit, but none of the C17 or C18 accounts of English pipemaking known to this writer note this use of ground fired pipeclay, though as recounted above (p. 168) Chalkley alleged - probably wrongly - that it was added to the clay mix in manufacturing English clay pipes up to ca.1745 and Southorn's of Broseley (p.143 above) certainly used it to bed their Churchwardens before firing and there is some evidence that the Broseley industry followed some very old traditions).

A remote possibility, but one which can almost certainly be dismissed, is that the grates were the special iron racks used to hold pipes when they were refired in order to clean them (J.S. Lindsay 1927: 69-70, figs 392-5, 1964 ed; Scott and Scott 1966: 44-6). This method of cleaning pipes, which burnt out nicotine and carbon, returned pipes to their original white colour but at some cost to their smoking qualities; and as is discussed later (p.414 below) it was a rather cheap method. It is unlikely in the extreme that pipemakers, who in fact relied for their livelyhood on the expendability of their product, would find this idea either attractive or profitable: the whole idea of these racks is obviously for home use or perhaps use by those such as publicans who were in the habit of passing out pipes to customers, often free, and were not above reusing their stock. Further, and even more decisively, it seems inconceivable that a maker would want as many of these racks as Church had "grates" - over 100 - when his business concentrated so much on high-quality products. Whatever these "grates" were, it seems likely they were special to the pipemaking industry, for a recent survey of 31 potters' probate inventories between the years 1662 and 1761 in the Staffordshire Potteries (Weatherill 1970), while listing a wide variety of tools and equipment - wheels, lathes, boards, shovels, pick-axes, paddles, baskets, pokers, hay for packing, heating flags, tiles, stools, benches, pack saddles, turning tools, moulds, and even "iron bands around the oven" - makes no mention of greats or grates: ironically, it would appear that the meaning of the term, a word clearly used in the pipemaking industry from the C17 to at least as late as ca.1900, now appears to be lost.

There is one contemporary account of English pipe manufacture at the end of the C17 (Houghton 1693/4: 204-6), though it is extremely brief and general compared to Duhamel du Monceau's account. A "good sort" of clay for tobacco pipes, according to Houghton, came from Poole, Dorset. This was dug out in square blocks weighing about half a cwt, and shipped thence to London where it was sold at ca.18s a ton, though when Houghton was writing (during the War of the League of Augsburg) the war had increased its price to about 23s a ton. A coarser type of clay came from the Isle of Wight, and this was often mixed with finer clay.

The clay had to be dried before being worked, and during this process it lost about a sixth of its volume. It was then steeped in water until it became a paste, after which it was beaten until it was homogeneous. From this, pieces large enough to make the pipe were rolled into blanks; the part that was to become the stem was pierced with a wire and the blank put in a brass mould. A brass stopper was put into the mould to form the bowl and the mould screwed tight in a wooden "mould" (that is, vice). The mould seams were then taken off by a woman with a knife, and the part thus treated smoothed. Houghton's remarks about the putting on of a "print" - presumably the maker's name or mark - are not entirely clear, but the instrument used was a stick with a hollowed top carved with the mark, which was used - it appears - on the stem. The pipes were then dried in the air or over a cinder fire - as Houghton says, "I presume coals that smoak will spoil colour" - and then fired in a kiln. The length of time for firing is not given, but Fuller, in his History of Worthies of England published in 1662 (quoted in W.E. Brown 1959: 242) and referring to the Gauntlett pipes made at Amesbury in Wiltshire, notes they were fired for 15 hrs. The "glased" (that is, polished) pipes were rubbed all over with a "smooth flint-stone" and "always dried over a fire" - this probably means (on analogy with Duhamel du Monceau's descriptions) that the pipes were dipped in some liquid prior to polishing, and then dried.

Six workmen made 60 gross pipes (8,500 to 11,000 depending on which gross is meant) a week, according to Houghton; the ordinary pipes sold for 1s6d a gross, the polished ones for 2s to 3s.

As well as being used for smoking tobacco, Houghton notes pipes were used to blow fires, and stem-fragments and specially-made pieces were used (by their being heated, to curl wigs (two pipe kilns discovered in 1970 in Helston in Cornwall and datable from the pipes found to the mid-C18 also produced a number of wig-curlers (Douch 1971: 148, 146)). Stem-fragments were also made red-hot and used to dry out gun-barrels which had been scoured. Powdered fired pipeclay would also take grease out of clothes if applied hot, and was also, Houghton averred, very good for whitening the teeth when rubbed on them (with what must have been disastrous effects to the enamel, as the two main constituents of ballclay, silicon dioxide and aluminium oxide (see Section IX below), are respectively quartz and corundum, both extremely abrasive; interestingly, however, abrasives used in modern dentifrices as whiteners or brighteners do include silica and alumina compounds in refined forms).[29] Houghton also quoted one source as saying that the clay used for pipes was the same as that used to make "chinaware" but he certainly cannot mean porcelain - he appears to be referring to a stoneware imitation of porcelain (see Section VII for further discussion).

The most valuable contribution to our knowledge of C17 English pipemaking, however, is a list of pipemaker's tools published in 1688 (Holme 1688: 271-2, 1905 ed). As material for this work was being already collected by 1649 it is fair to say that the descriptions given represent equipment typical of the second half of the C17 if not earlier. Unfortunately the precise use of a number of the tools is not given, but in some cases this can be deduced. The boards on which the pipes were "rolled to the length of their shankes" (i.e. stems) was called a 'shanking or smoothing board'. Two wires are described - one a 'moulding wire'

> to make an hole through the length of the shank. It is only
> a smooth wyer, set in a round handle

and the other a 'shanking wire', "onely a plaine smooth wyer, by which the hole is made through the pipe Shank". No mention is made in either case of the wire having a blunted or widened end, but both appear to fulfil the function of the modern wire. Possibly one has been confused with the modern finisher's wire, but from the terms used by Holme it is impossible to decide which wire might have been used for this purpose - the Birmingham City Museum wire is catalogued as a moulding wire (see above). The moulds were bipartite; some bore decoration and a number of different shapes, lengths, and styles were noted.

The apparatus for making the pipes was called a 'screw', and comprised a 'bench', a 'gin', a 'gin handle', the 'stay of the handle', the 'stopper', and 'brush', the 'runner', the 'trough', the 'screw and pin and box', and the 'cantril and screw'. The bench is described as having "four strong square feet", and the cantril[30] and screw fastened the rest of the equipment to the bench from underneath. The gin here appears to specifically relate to the head in the modern industry, for the stopper is described as being attached to the gin handle - this last being the handle of the modern industry. The stay of the handle is described as preventing the handle from descending beyond a certain point, which suggests it was a wedge fitted in the slot in the gin which took the handle. The screw was what is known in the modern industry as the chest, and the runner was the hollow of the trough - the term runner was used by Hamilton's of Belfast (see above). The brush is not described, but may just possibly be the slot - the pad of soft material faced with a sheet of metal fitting on to the vice faces. The screw and pin and box are described as being on the outside of the trough, from which it appears that the pin was probably the handle which turned the shaft attached to the moving face of the vice and that the screw was this shaft, though it may be the opposite way round. The box must be the fitting through which the shaft moving the vice passed through the trough - Hamilton's again used this term for this part of the instrument.

Quite a number of tools, apparently finishing tools, are noted; but their functions are not always stated. There was a 'hook tool', described as "a long Iron with a Bended end, set in a round handle, hooped" - this appears to be the tool in Birmingham City Museum, called a hook by Chalkley, and probably a tool similar to the Dutch smoier (see above). Holme also notes a 'head scraper' for making the bowl smooth, a 'burnisher' for polishing, a 'trimming smoother' also for polishing, and a 'rubber' presumably for similar work (these latter distinct from the 'shanking tool' specifically to finish the stems), which might suggest the hook tool was perhaps for a different purpose. Its name would certainly be applicable to the removal of the dottle or pep in the manner of the hook on the handle-end of the French estriqueux. Another tool is called a 'chisel' but its use and appearance are not noted - just possibly it was the tool used to make the denticulated mark round the bowl beneath the lip, if the chisel blade had a fine saw edge.

Three types of files are noted - a 'bullet file', a 'playing file' (neither of which is described as to use or appearance), and a 'split file', described as "an Iron rod thicker than a good wyer, it is bent a little from the handle to a square and then runs out streight", but their use is not stated. They may have been for reaming worn moulds.

A 'pen or shanking knife' is noted but no further information is given: however, it should be a form of trimmer's knife used on the shank or stem. The 'head scraper', however, was to trim the bowl, for it is described as

> like a knife with a bended point and as if an halfe round nick were broken neere it; or in some the hook end supplying that nick. It is to scrape away all the Mold marks and made the head smooth.

Thus it fulfils the function of the finisher's knife with its grooves used in the modern industry. A 'shanking tool', described as having hollows in it, and used to rub, polish, and smooth the pipe shanks, is the modern smoother - shanker is a term used in the Birmingham museum catalogue.

A surprising number of polishing or smoothing tools are listed. There is a 'trimming smoother' which was "to polish and smooth the pipe, when it is all made to that", which perhaps suggests it finishes off the work done by the head scraper and shanking tool; a 'rubber', described as "a plaine round Iron, with a Flat end, and set in a wooden handle hooped" which must have been some sort of polisher; and a 'burnisher', described as "a Rounde Steele, with a round end very smoothly polished". This last was probably the tool used to obtain the polished surface found on a number of later C17 pipes and referred to by Houghton as "glased" and by Holme as "gleased". It may have been similar in appearance to the agate or flint stone shaped into a cone and mounted in a handle used in The Netherlands.

Houghton mentions "glazing" - that is polishing or burnishing - pipes, and two Statutes of the Realm refer to the imposition of a tax from 17 May 1696 of 1s per gross of 144 on unglazed pipes and 1s6d on glazed pipes (7 and 8 Gul. III c.31, XLIX) which was removed two years later, 1 August 1698, as it was "vexatious and troublesome and very chargeable in the buying and collecting of same" (9 Gul. III c.45, I). To judge from pipes examined by the writer in collections in the south and west of England and South Wales, polishing of this kind only became common from about the 1670s, continuing into the C18 (cf Atkinson 1965c: 92, rev ed 1969b; 1973: passim). Bristol and Marlborough type 9 bowls were frequently beautifully finished. However, certain earlier pipes, such as the Gauntlett and Hunt pipes of Wiltshire and Bristol in the mid-C17, also had a stroke-burnished effect. Atkinson (1966: 273-4 and 276 n.6) noting a Sussex pipemaker of ca.1770 burnishing his pipes, mentions that this was a feature of nearly all Broseley pipes of the C17 and C18 - as noted above (p.147), this famous Broseley finish was apparently continued into modern times; the method of obtaining it is certainly still remembered there. An advertisement of 1799 among the pages of the Bristol Pipemakers' Guild Book and listing the products and prices of four Bristol makers included under their very expensive catagory of "long" pipes glazed and unglazed versions, but it is unclear whether this refers to the finely-polished finish or merely to a glazed mouthpiece, which latter feature was appearing towards the end of the C18 (see p.148 above). The "long" pipes were clearly prestige quality products, for they cost from 2s6 to 4s6d a gross compared to 1s8d for "common long" pipes and 1s-1s4d for "short" pipes, and glazing added another 6d a gross. Glazing was apparently only done to the premier-quality "long" pipes, and at a cost of 6d a gross extra it may have been stroke-burnishing which was done, which would have taken skill and time, rather than a simple dipping of the mouthpieces in a glaze.

Lastly, Holme notes the 'button', with which "the hollow in the head is made and dressed smooth within" - this indicates the main use was to smooth off the upper inside of the bowl rather than specifically round off the top of the rim.

No description is given of the firing; but a 'drier', a board of "wooden ribbs with cross peeces nailed over them to hold them together" and on which the finished pipes were laid for drying before firing, is described.

Perhaps the most interesting feature about this list of items is the existence as early as the second half of the C17 of the head and handle. Hitherto, the earliest definite reference known to the writer was that in Good, Gregory, and Bosworth (eds) 1813 (text and illustration). The head and handles in the various museum exhibits referred to previously presumably date to the C19, when the firms using them were flourishing, but the only one known to this writer which can be in any way dated is that in Birmingham museum, which was used by Thomas Reynolds between 1875 and 1893. The instrument may have come from an earlier business run by Reynolds and his father in the 1850s, and of course could have been bought by them from a still earlier manufacturer.

An advertisement in the Ipswich Journal of 17 March 1759 (quoted in Gant 1959b) announcing a pipemaking premises for let lists among items to be sold "the Moulds, Screws and other Utensils in the Business": either the head and handles were among the "other Utensils" or they were being kept with the premises, or, as with Flanagan's of Leicester 200 years later, this tool was not used. A similar notice of sale at Great Yarmouth in 1757 unfortunately talks only of "Stock...Tools...kilns" (Oswald 1970b: 239). Houghton, writing at the end of the C17, says a stopper was put into the mould but gives no indication as to how this was done, and one might have thought he would have noted a head and handle had one been used. A reference of 1701 (quoted in Harley 1964: 214) to a "Tobacco-engine and press" must refer to the equipment used in preparing tobacco (described in Holme 1688: 272-3, 1905 ed).

However, as early as 1619, the first charter of the Westminster pipemakers' guild (see 3: I) laid down that no person not a member of the guild should

> practice use or exercise the acte or mistery of makeing of
> Tobacco Pipes of any matter or forme whatsoever nor shall nor
> may erect or sett up or mayntayne any furnace Structure
> instrument of Engyn for the makeinge framinge or workinge of
> the saide Tobacco pipes....

and the reference here to an "engine" may indicate the use of a head and handle this early. If so, however, it cannot have been common or one would have expected the English pipemakers who were emigrating The Netherlands at the beginning of the C17 to have known of it (unless, of course, they voluntarily abandoned it in favour of the more tedious but more delicate process they are known to have used subsequently - for this possibility, see below). As will be noted in detail later, latex moulds of the insides of pipe bowls have been made in Ottawa - that of the one early (first quarter of the C17) Dutch bowl shows an asymetrical stopper was used, but this does not necessarily imply the use of a head and handle - it might more reasonably indicate the use of a simple stopper, finger-shaped (the finger may well have been the first stopper), thrust in just as Flanagan used. Unfortunately, with the exception of this single bowl, no Dutch bowls earlier than the mid-C18 were available for similar examination - by this latter time the symetrical acorn form was certainly being used, but this merely confirms Duhamel du Monceau's account of slightly later.

Other points of interest arising from Holme's descriptions is the use of C17 terms for parts of the chest at Belfast up to the beginning of this century, and the use of equally-old terms in cataloguing certain tools at Birmingham museum - unfortunately it is not known whether these terms were used by Renolds, the owner of the equipment, or not.

Another point of interest is the multiplicity of smoothing and polishing tools. This is probably connected with the appearance of polished - "glazed" - English pipes during the later part of the C17. This in turn may have been an attempt to bring English pipes nearer in quality to Dutch ones, for certainly by the 1690s the superior quality of the latter was being remarked upon (Houghton 1695/6: 1st page).

Specialist tools were certainly known in the pipemaking trade by the 1630s on the evidence of the Bristol Apprentice Rolls. Bartholemew Elliott, apprenticed to Edward Lewis in 1632/3 "for eight years, and one year without payment" was to receive "for interest" at the end of his apprenticeship tools to the value of 20s; and Richard Jones, apprenticed to the same master in 1637/8 "for seven years and one covenant year" was to receive at the end of his term "one Mould and one screw 2 toole belonging to the trade or xxxs [30s]". The "screw", on Holmes's evidence noted above, could include the work-table, but here it probably simply means the chest, which suggests that the Dutch term for the vice - schroef (screw) - may be a direct translation of the English term used prior to the introduction of the word chest. The prices given suggest one would need a minimum of some 20s to 30s-worth of equipment before one could set up as a journeyman, and more if one wished to set up as a master. Direct evidence for pipemakers' wages at this time is lacking, but 1s a week would probably not be far out (see 6: II). In 1654 more prosperous times are indicated by Lewis Williams being apprenticed to William Williams I of Bristol for seven years and one covenant year and being promised at the end of his term 30s as well as "a mould and a screw".

Later in the century, however, evidence suggests moulds had become cheaper. The estate of John Barnard jr of Bodmin in 1670 included "three pip molds with thngs usefull" valued at only 10s (Douch 1971: 147), while the 1676 inventory of the effects of a deceased Boston pipemaker, James Harford, included "2 pr. of... five pr. of moulds and other implements belonging to his trade" valued at £1 16 8 (P.K. Wells 1972: 13). The 1683 inventory of another Bodmin maker, Simon Earle I, lists "his moulds and tooles belonging to his trade" at £4 10s (Douch loc. cit.), which might suggest more expensive equipment; but similar lists for two deceased Norfolk makers, one dated 1674 for William Harpley of Great Yarmouth and the other dated 1691/2 for William Case of Downham Market, also gave low values for pipemaking tools, the former merely listing "all sorts of working tools belonging to the trade" at £1 and the latter "4 skines of clay with ye materialls to make tobacco pipes" all valued together at £3 4 6 (Oswald in litt. 11 October 1972). Indeed, yet another Cornish maker, Nicholas Hambly of Truro, had in the inventory of his estate made in 1690 "pipe moulds and clay" valued as low as 5s (Douch 1971: 150). Two inventories dated rather later, that for William Artwell of Arundel dated 1727 and one for Matthew Heblethwight of Lincoln dated 1729/30, bear out these low values, the former listing two pairs of screws and moulds and boards and "greats" totalling £3 5 6 (G.H. Kenyon 1958: 106 and Atkinson 1972e: 39; for a discussion of "greats" see p.271 above) and the latter listing merely "In ye shop ye working tools" valued at £2 (P.K. Wells files).

Deductions can be made about early English manufacturing methods from a study of the technical terms used in the present Dutch industry and from a close study of the pipes themselves.

It is recorded in 1748 that the names of the principal working tools of the Dutch industry were English (cited in Porter 1832: 103; Fairholt 1859: 167 citing Marryat's History of Pottery and Porcelain, p.65; and H.E. Smith 1860: 213 citing - erroneously - Croker 1835: 28). Further, certain of the terms, while English in origin, reflect words not recorded in the English trade by any of the written sources noted by this writer. For example, the term for moulder is kaster, and for mould, vorm. Kaster derives (Brongers

1964b: 37-8) from the English "to cast" - otherwise kast in Dutch is a chest or cupboard. Oswald (1961: 56-7) notes that about half of his type 2, datable to c.1580-1620, were hand made (comments on this in Oswald 1970b: 225 are less accurate - Oswald in litt. 23 October 1970), and as will be described in detail in the next chapter English pipemakers were emigrating to The Netherlands in the first two decades of the C17: this and the Dutch evidence suggests that the terms moulder and mould only came into general use in the English pipe industry after the Dutch industry had started and when the hand-shaping of pipes had gone out in favour of mould-shaping. It is thus probable that the earliest term in English for the man who shaped the pipes was "caster" and that the process was called "casting". (G.B. Hughes (1961b: 1634), talking of clay pipe moulds, asserts that "Sturtevant referred to such a press in 1614 [sic]" but Hughes is an inaccurate source and his reference, which is presumably Simon Sturtevant's Treatise on Metallica of 1612, does not appear to refer to tobacco pipe moulds.)

Similarly, the agglutinative Dutch term pijpenpotten for (pipe-)saggars suggests that neither the latter term nor any other specialist term had evolved by the time the English pipemakers had emigrated to The Netherlands, and this too agrees with other evidence, for the term saggar appears to be peculiarly English and not have come into use before the later C17 (see Appendix V). However, saggars are known long before the C17 - they have been found on several sites in contexts datable to the end of the C15 and early C16 (Mayes, Price, and le Patrouel 1966; Brears 1968; also in litt. 26 March 1968) while at a site in Nuneaton they first appear as simple adaptations of cooking-pots probably ca.1450 and evolve thereafter, as evidenced by finds at later kilns at the same site (unpublished; information from the excavator R. Thomson, Southampton City Museums, at the Autumn Conference of the Society for Post-Medieval Archaeology, Portsmouth, November 1968). However, no special term to describe them is known.

R. Thursfield (1863: 81) - quoted without acknowledgement by E.T. Stevens (1876: 108-110) - comparing contemporary pipemaking to that of earlier times, says that while pipes are now placed in saggars "after the Dutch mode" for firing, in early times they were rested on their bowls with the stems supported by rings of pipeclay (not fireclay) placed one atop the other as the kiln was filled. However, Thursfield said that this method resulted in at least 20% of the pipes warping or breaking in the kiln, whereas with the modern method not more than one per cent of the pipes break. (Nor surprisingly, he notes that modern kilns held far more pipes - whereas in earlier times a kiln did not hold more than 20 to 24 gross and took 15 cwt to a ton of coal to fire that amount a modern kiln could take 350-400 gross and use no more than 8 to 10 tons of coal).

However, methods of firing pipes appear to differ both with maker and type of pipe. Pollock's use the boisseau type of saggar for their Churchwardens, but they use round ones with bottoms for their small pipes; McDougall's used similar saggars for their small pipes, but rectangular ones with bottoms for their Churchwardens Pollock's prefer their method for Churchwardens because they find it gives fewer breakages and probably gives a better quantity-space ratio. As has been noted earlier, several other methods of potting pipes were known, and it seems likely that they represent traditional methods handed down rather than any real breakthrough in improved firing. As can be observed again and again, pipemaking has many of the elements of a primitive craft in its following of traditions of method and terminology. In the majority of cases these represent the father-to-son, master-to-apprentice method of learning the trade and its lore. The significance of certain features - if indeed there is any in many of the aspects - has often been lost in time.

It is possible, and would agree with Thursfield's remark, and those in Rees, that the Dutch were responsible for sophisticated saggars - this would be quite in keeping with their sophisticated methods of pipe production and striving for perfection.

Other words at Gouda which are English-derived (apart from possibly *directie*, as is discussed in p.109 n.10) are *weijer* for the wire or piercer, *smoier* for smoother, and *schenker(tje)* for shanker, another term for smoother, though apparently not used in the British industry at present. (In Britain the pipe stem is still called the "shank"). The term wire in the English industry is in widespread use, and its occurrence suggests that from earliest times a wire was used - as opposed to, for example, a straw surrounded by the clay which would burn out during the firing, a technique assumed to have been used by the Amerindians in North America. Yet another term which is of English origin is *tremster* or *tremmer* for trimmer (cf Brongers 1964b: 37-8). Neither the terms for wire nor trimmer has any similarity to the orthodox Dutch words for these terms.

At Courtrai, where the terminology is in the Flemish dialect of Dutch and presumably Dutch-derived, there are similar examples of English-origin words. Apart from *stopper* and the *trem-* root words (*tremmer* and *tremmen*), there is *rolle* for the roll, *weier* for the wire, and *smoetter* for the *schenkertje*. *Rolle* and *weier* are presumably only spelling variants of the Dutch *rol* and *weijer*, but the term *smoetter* is of interest because it suggests there has been a confusion between two rather similarly-shaped Dutch tools, the *smoier* and the *schenkertje*. The *smoetter* is not described in detail, but it is noted as being a curved piece of wire, which definitely equates it to the *schenkertje*, whereas the *smoier* has a curved, flat-faced, piece of metal: the apparent transfer of the "smoothing" name from the *smoier* to the *schenkertje*-type tool would suggest a confusion of terms, perhaps caused by dying traditions within the Flemish industry. (The fact that a late C19 account of Courtrai pipemaking refers to what is presumably the *smoetter* merely as an *ijzerken* (literally, small piece of iron) suggests the old terminology might have been fading by that time, which could account for terms becoming confused; the same account also called the wire simply an *ijzerdraad* (literally, an iron wire) and used the term *stuiker* (literally, stamper) for the stopper, again suggesting traditional technological terminology was becoming lost in the Flemish-speaking area of Belgium.)

Perhaps the most interesting word of English origin used in the Continental industries is the term "button" for the implement used to smooth off the rim of the bowl. In Dutch this becomes *botter*, a term otherwise used only for a fishing-boat. The German term, assuming a button was used in the Westerwald and Brandenburg industries, is unfortunately lost; but at Andenne the Westerwald-derived industry, its terminology albeit modified by Walloon French pronunciation and spelling, used *boton*, a word otherwise unknown. At Courtrai, the Flemish term is *bottom*, again a word otherwise unknown but in fact closer to the English than the Dutch term is. In North France, on the other hand, the term noted by Duhamel du Monceau is a direct translation - or a rationalization - of the English term and becomes bouton.

FIG 118 is a list of technical terms used in the countries of the studies which are, or possibly are, related among themselves (I am grateful to Mr R.G. Dening of the Centre for Modern Languages, Bath University of Technology, for assistance with the German terms and to Mr D. van der Want of the Zenith Plateelbakkerij en Pijpenfabriek, Gouda, and Mr P.H. Barkema and Mr E.G. Gerridzen of the Secretary of State Department's Translation Bureau for assistance with Dutch and Flemish terminology).

Unfortunately, few pipe kilns have been excavated, and only four - one in Boston (P.K. Wells 1970); one at Lewes (Norris 1971; illus. in Atkinson 1962b); one at Stamford (in Cherry 1973: 114-5); and one at Portsmouth, found together with fragments of three others (in Moorhouse 1972b: 204, 216-7, 218 fig 73) - have so far been published. One of unknown date was noted, but with no description of structure or of pipes found, at St Neots, Huntingdonshire (Tebutt 1956: 83). A C17 kiln was destroyed by a mechanical excavator at Potovens, Yorkshire, before its significance was realized (Brears 1965: 19; 1968: 13); and the site of a late C17 kiln was noted during the construction of a by-pass at Chudleigh in South Devon (Arch. Rev. 6 (1971) 45 s.v. Chudleigh; repeated in Cherry 1973: 114). An early C18 kiln at St Albans yielded "Several hundred clay pipe specimens...with other material including the brick base of the kiln" (Anonymous 1970b: 33), and a possible example associated with pipes datable to 1660-1750 but with no kiln-furniture was excavated at Peterborough (Dakin 1969: 164). Another, with flues and floor clearly traceable, was found in January 1869 built against the C13 wall of Bishop Langton's palace at Lichfield which had been destroyed by parliamentary forces in the C17. Several hundred pipes were found together with coal, clinker, and unburnt clay; the pipes are described as having bowls ca.1 ins high and 3/8 ins in diameter at the mouth. Presumably the kiln dates to the mid-C17, to judge from the historical evidence and the size of the pipes. Some of the pipes, including a complete but unfired example, were given to Lichfield Museum (Hewitt 1869).

Archaeological and documentary evidence indicates the Boston kiln, as noted earlier, was in use from ca.1850 to 1919, the business being run by two generations of the Manning family. Kiln-furniture found included saggars, mostly cylindrical but some rectangular, some made of fireclay, sometimes with pipe-fragments added, and some of pipeclay and pipe-fragments; rings of pipeclay on which impressions of bowls indicate their use to support stacks of pipes in the kiln; props made of pipeclay and roughly-crushed pipe-fragments which were probably used in the circular saggars to support cutties during firing; pieces of pipeclay fabric with stem-fragments and sometimes long stem parts for strengthening; and a slab of the same material which seems to have a peep-hole in it and was probably part of the door-blocking. The pipeclay rings occurred in pre-ca.1860 levels, the saggar fragments in post-ca.1860 levels, suggesting a change in manufacturing process about this time. The kiln appears to have been an updraught. It was one of a number in the area, and its foundation layer contained pipes and debris from an earlier kiln of the first half of the century, including a fragment of what appears to be fired pipeclay with a series of stem-fragments embedded in it, suggesting there may have been an earlier muffle-kiln in the vicinity. Immediately adjoining the kiln was the remains of a subsequently-built chamber with flues in its walls - this was probably where the pipes were stoved in warm air from the kiln preparatory to firing (P.K. Wells in litt. 20 December 1967 and 27 January 1968; paper delivered at the Spring Conference of the Society for Post-Medieval Archaeology, Lincoln, March 1969: see now P.K. Wells 1970).

The Stamford pipe kiln was also C19 in date. It and the attached shop belonged to George Longstaff, who probably took over an existing kiln from Robert Middleton ca.1845. Originally the kiln had been built into the shop with the chimney coming through the shop roof, and would have been fired from the ground floor and probably loaded from the second storey, but in 1873 Longstaff submitted plans for alterations to the kiln to permit him to fire it from the rear of the premises. Unfortunately, no more historical evidence is given; Oswald notes Longstaff at Stamford in 1850 (Oswald 1960a: 79), but does not list Middleton. The kiln was constructed of hand-made bricks, with a lining of fireclay bricks, and had an arched stoke-hole and metal fire-bars. "Crescent-shaped pipe supports", perhaps the same as Wells's pipeclay rings used to support stacks of pipes in the kiln, and saggars were found. Remains of an earlier structure were found beneath the kiln, but it was not possible to determine whether this represented an earlier kiln (in Cherry 1973: 114-5).

The Lewes kiln was another dated to the C19. The initial structure was associated with a few pipes attributable to two makers of the 1830s-earlier 1840s and was thus presumably constructed in the 1830s. Pipes attributable to three makers covering the 1850s-1870s were also found, and towards the end of its life - ca.1880 - the kiln had apparently been reduced in size, perhaps because of falling production. A large amount of the pre-1880 muffle (which the excavator throughout miscalls the saggar) was found, its walls being made of 2-ins thick fireclay strengthened with broken pipestems pressed horizontally into the clay. All of these stems which were marked bore the mark of an 1860s maker, Charles Corner, giving a terminus post quem for its construction and strongly suggest that Corner himself built it (Norris 1971). The excavator bases his reconstruction to a considerable degree on the description and illustrations in Ure's encyclopaedia already noted.

At Portsmouth remains of four pipe kilns datable from the mid-C17 onwards were found but only one was well-preserved, two of the others being represented only by fragments of the base and the third, which was rectangular, existing only as a base. The fourth was a single-flue updraught kiln of brick, and appears from the description to have been a muffle-kiln, two of the piers which probably held the muffle and remains of three linings of mixed pipeclay and pipe stem-fragments which probably constituted rebuilt muffles being found (see below). Wasters from the last firing bore the marks of two makers at present unidentified, but the bowls indicated a date of ca.1690-1700, presumably the terminal date of the kiln, and pipes of a ca.1670 date were found in the construction material of the kiln, suggesting the kiln dated to within the last quarter of the C17 (in Moorhouse 1972b: 216-7, 218 fig 73).

Fragments of pipeclay with stems embedded in it have been found on a number of sites. Fragments of what appears to be repeatedly-fired pipeclay have been found at Lambeth (material in Birmingham City Museum and Art Gallery) and Truro (material in the County Museum there), and Oswald (in litt. 3 February 1968) notes similar material is known from Southwark and Warwick. None of these finds is datable, though the Truro material came from an area known to have had C19 pipemakers working there, but dated material covering a wide range in area and time is known from several other sites. It has been found at Chichester, in a context probably of the first half of the C19 (Atkinson 1968: 13); in Bristol, from the Water St-Hollister St kiln apparently belonging to the John Okely F 1732 fl 1739 (material in Bristol City Museum), from the Whitson St kiln-site belonging to the Robert Tippet family and datable from associated pipe-bowls to ca.1680-1760 (Marochan and Reed n.d.), and from the Castle Green kiln belonging to Israel Carey II and datable to ca.1782-92 (seen by the writer in Bristol Museum November 1973; see also R. Jackson 1972); from the kiln of one of the Sidney family - probably Reuben, whose pipes have been found at Louisbourg, Nova Scotia, Canada (I. Walker 1971c: 76, 81, 86 fig 25) - in Southampton with a date from associated pottery of ca.1725-35 (ex info. R. Thomson, Southampton City Museums); in a kiln in Colchester where bowls datable to the earlier C18 were found in the clay (Gant 1960; in litt. 13 and 14 November 1968); in a kiln at Dorchester, Dorset, in association with bowls of late C17-early C18 shape (E. Watkins 1966: 224, 217); at Portsmouth, in one of the kilns noted above and datable to the last quarter of the C17 (in Moorhouse 1972b: 216-7, 218 fig 73); at Cambridge, where the stems were said to "resemble those of the pipes found here and there in the upper parts of the deposits, and do not any of them appear to be earlier than the second half of the seventeenth century" (T.McK. Hughes 1915: 24, pl I); and at Ipswich, where bowls in the clay dated to the second half of the C17 (Owles and Smedley 1966: 280 s.v. Ipswich - Portman Road).

In some of these examples the stem-fragments are neatly laid in groups, the stems in each group being parallel to each other and the groups lying at right angles to each other. The Colchester, Ipswich, and Bristol Tippet kilns yielded lumps of this mixture including bowls; in the Portsmouth and Bristol Okely kilns the stems were found sandwiched between two layers of clay instead of being on one surface. These layers are about an inch thick and the stem fragments are neatly laid out about half-an-inch from each other, unlike in at least some of the others where they are laid close together. The Portsmouth material has been fixed on one side at one time to something with a fine-grained surface perhaps wood. (The Colchester kiln is noted by Harley (1963: 35) but here, as on a number of other occasions, Harley is inaccurate. There is no evidence to indicate that the kiln was run by a Dutch immigrant, as Harley suggests, and the "Dutch" pipe bowls referred to are Oswald's type 9 which are sometimes called Dutch because of their supposed origin in Dutch styles influencing the English industry towards the end of the C17 - this point is discussed in 1: II(a) and 6: VII(a)(2). However, a description of pipemaking in Colchester 1906 refers to a muffle-kiln (Benham 1906 - see also above).)

As noted earlier, these remains seem to be the material described by four C19 encyclopaedias as being used to construct a muffle-kiln. There are some differences, the fragments found generally having the stem-fragments on a clay backing rather than in the middle and certainly in some cases definitely not all stems were long pieces nor lying in one direction; but if we allow for some variety of construction, these descriptions appear to fit these fragments. It is uncertain whether such construction was limited to muffle-kilns, but if so, it indicates existence of this type of kiln by the second half of the C17. The use of the term muffle for a crucible is first recorded in 1644, but its use was apparently restricted to chemistry and metallurgy, and its first recorded use in ceramics was not until 1742 when it was used to describe a muffle-kiln (OED vol VI). Duhamel du Monceau notes muffle-kilns - perhaps with muffles made of pipeclay - at Rouen by 1771, but Good *et al.* in 1813 describe muffle-kilns as though they were little-known at that date.

It seems surprising that valuable pipeclay should have been wasted in this way when presumably fireclay would have been cheaper. (The encyclopaedias simply talk of "clay" being used, without any further description.) Oswald (*in litt.* 3 February 1968) has suggested the material to be kiln repair or discarded stems in a remade kiln floor, and certainly broken stems can collect on a kiln floor (e.g. at Hamilton's - FIG 67 - and probably especially in kilns which were not downdraught). However, as noted above, R. Thursfield says - presumably quoting an earlier source though this is not stated - that before 'Dutch type' saggars were introduced rings of pipeclay were used to support the pipes, the rings being placed one atop the other, which indicates pipeclay was being used for props.

Duhamel du Monceau, as already noted, mentions pipeclay with iron and other impurities being set aside for *raccommodage des pots*. This literally means "pot repairs", but it is unclear what he means by *pots*. Elsewhere he refers to the inner chamber of the kiln as the *pot* or *chambre* and one might assume that it was to repair this that the pipeclay was used. Duhamel Monceau nowhere appears to use *pot* for saggar, but he does use the term *empoter* for the stacking of the pipes in the saggars ("potting" in the British industry) and *dépoter* for the unpacking of them, so it is not impossible that *raccommodage des pots* could mean "saggar repairs".

In 1968 the remains of a pipemaking premises at the Quay, Truro, were examined after demolition work. Here pipes were found stacked, apparently for firing, bowl-first into small Calenick crucibles. These crucibles were produced from ca.1770, when they were invented as the first successful British answer to the Continental ones hitherto used in asseying, until the early 1900s (Staal 1957) but it is strange to find them being used in this fashion, for it must have been an extremely inefficient method of firing. Calenick crucibles came in a whole range of sizes - those from the pipe-making site were 3 ins high, 3 ins in rim diameter, 1-3/4 ins in basal diameter, and bowl-like in shape (*ex info.* County Museum, Truro).

Work in 1967 by Miss E.A. Wylie of the Research Division of the National Historic Parks and Sites Branch in Ottawa under the general supervision of the writer has revealed certain facts about the early manufacture of English pipes.

Latex moulds were made of the interior of a number of English bowls covering a period from ca.1600 to the mid-C19, and these produced not one symmetrical shape. Instead, a series of types appeared, which preliminary work indicates might form a broadly-datable series, all of which suggest that English pipes from earliest times had their bowls formed by a direct thrusting motion from an asymmetrically-shaped stopper. As was to be expected, the latex moulds from C19 material produced shapes extremely similar to recent stoppers seen by the writer in museums or in recently-producing factories, or illustrated in accounts of recent pipemaking. Latex moulds from mid-C18 Dutch bowls, however, produced symmetrical, acorn, shapes, exactly the same as that illustrated by Duhamel du Monceau for Dutch (and French) stoppers. The latex moulds even showed fine striations, whether encircling bands or spirals is impossible to say, which had been made as the stopper had been turned round. However, the latex mould from a Dutch pipe datable to the first quarter of the C17 revealed an asymmetrical stopper, which reinforces the probability that the symmetrical stopper used with a turning motion was a Dutch invention. As the latter's use involved more expenditure of time and effort, one assumes that its introduction was deliberate and probably to obtain the sometimes shell-like delicacy of Dutch bowls. The moulds from British bowls, on the other hand, show vertical striations on material from all periods, emphasizing the thrusting use of the stopper throughout the history of British manufacture.[31]

Examination of the tops of pipe bowls indicates that the practice of cutting smooth the top of the bowl after the stopper had been withdrawn first occurs on bowls of Oswald's type 9, ca.1680, and onwards (the fine scratches from the knife can sometimes be seen across the rim). Earlier material, and later material of Oswald's types 7 and 8 which continue to ca.1720, were button-finished, a fact deducible from a thin line often visible immediately under the rim on the side of the bowl facing the smoker and a bevelled lip on the opposite side. This was caused by the button's not being set carefully enough on the rim, which on pre-type 9 pipes is at an angle to the line of the stem and therefore demanded care in fitting the button on - care not always exercised. Type 9 pipes almost always have the plane of the bowl lip parallel to the stem, and this feature may be connected with the non-use of the button. From this it seems reasonable to deduce that moulds did not have the slot to take the knife before type 9 pipes appeared. The slot is standard on C19 moulds, though a few are known which do not have this feature.

Towards the end of the C17 the denticulation round the lip of the bowl, applied neatly in the earlier part of the century, tends to become more and more haphazardly applied, becoming only a partial marking and disappearing on pipes of the 1680-1720 period. If this marking was put on with a saw-like blade or a thicker milled edge going round the foot of the button, as was done at Dunkirk and Gouda in the later C18, then its disappearance in England about the same time as the button might not be coincidence. However, at least on Bristol evidence, a perfunctory partial denticulation does occur on some type 9 bowls which should date to the early C18 and definitely have knife-finished tops. At Gloucester City Museum there is a type 9 bowl of Isaac Evans of Bristol free 1698 which should be datable to the first quarter of the C18 and is liberally decorated with criss-cross denticulation from a blade, indicating the latter's continued use at that time (see 6: VII(a)(2)). (Dutch pipes continued to be made with beautifully meticulous denticulation until at least the second half of the C19 (e.g. Friederich 1964d: 4 and C19 excavated examples seen by this writer; cf Atkinson 1972d: 177 n.5). The instruments used at one time at Broseley to make this marking and until recently were in the possession of the Southorn family (FIG 119) were known as mushrooms and were made of pipeclay (Oswald in litt. 19 May 1967; 1970b: 226, pl 200b). They were placed in the bowl and had a metal stem attached to the top with a cog-wheel at the other end which could be run (by the stem) round the bowl rim, and were thus not connected with the use or non-use of a button.

The mushrooms at Southorn's were very old, perhaps late C17-early C18 according to Oswald, which would agree with what is known about the use of denticulation as a decoration. No evidence for the use of the mushroom, nor for the tool itself, was forthcoming when the writer visited Southorn's in July 1968; a chart of Southorn pipe types probably belonging to the beginning of the C20 shows a few pipes with a type of milling below the bowl rim but it is impossible to say whether this had been applied by a mushroom or was mould-imparted. Mould-imparted milling below the rim, if this decoration was applied at all, seems to have been the invariable case elsewhere in the C19. (One of the Southorn types bearing this decoration is the firm's "Long Dutch Straw", which indicates that the Dutch tradition for this marking was acknowledged.)

Omwake (1963c: 4-5) says the technique continued well into the C18, but from the evidence available to this writer he feels this dating is too late. Omwake also says that the feature can occasionally be seen on pipes made during the last quarter of the C19, especially on those made in Ireland, but it is possible that Omwake had seen mould-imparted decoration (cf Oswald 1970b: 226, where he says the technique was revived in the mid-C19). Earlier (p.3), Omwake mentions an 1875 catalogue of a Waterford firm in another context - possibly the illustrations showed this form of decoration. In this writer's experience a genuinely-denticulated C19 bowl would be an extreme rarity; Atkinson (1972d: 177 n.5), agreeing that the tradition died out in England ca.1700, notes its reoccurrence in moulded form in the C19 but can cite only one English pipe of C19 date with true milling, a pipe of unusual quality manufactured by a London maker ca.1866. (There is a good deal of confusion about "Irish" pipes, because while pipes were manufactured there, at least in the C19, the words "Dublin", "Cork", and "Limerick" which appear on pipe-bowls refer not to their place of manufacture but to pipe types, and some examples seen by this writer do have mould-imparted decoration of the type under discussion.)

Whether the mushroom was an instrument in widespread use elsewhere is not known; as the Broseley industry has some unique features and appears to have evolved on its own to a considerable extent it is possible the mushroom may be peculiar to Broseley. However, no other tools for such marking are known, either in the present industry, museum collections, or in the literature, though clearly some tool for the purpose was in common enough use in the C17. No buttons are known to survive, though the evidence of the pipes themselves and Holme's C17 reference indicate they were common in the C17. (It was not unknown in the C17 for distinguishing marks to be put on pipe heels in the form of lines apparently made by either the instrument which applied the denticulation or the finisher's-knife (e.g. T.P. Cooper 1907: 106, 105 fig 6, 106 fig 7 third-fifth examples) - examples are recorded from Kingston upon Hull (Sheppard 1902: 25-6, 1912 ed) and this form of marking appears to have been common in Colchester (Cotton 1962: 59; Gant 1967a: 13).)

Another feature which the latex moulds show is the scar where the wire has touched the side of the bowl on the farther side of the bowl from the stem. As already noted in describing the present manufacturing process, the wire is inserted almost as far as the bowl, the stopper is then inserted, and then the wire is pushed fully in to complete the bore. In doing this, the wire often hits the farther side of the bowl, leaving the scar. The fact that this scar is found on pipes from the earliest times (and on Dutch pipes) indicates that the same process must have been used from the beginning of the pipemaking industry.

Jewitt (1863: 77; repeated in 1878: I, 295) says that the bowls of many of the older pipes have been scraped into form after moulding, and Harley (1963: 13) notes that older pipes were often hand-scraped into final shape. This writer has not seen any bowls so treated, but has occasionally seen scraped stems, though in his opinion these are more likely to have been the fault of a careless trimmer. However, though moulded pipes appear amongst the earliest groups, indicating moulds were being used from the beginning of the industry, hand-made pipes from the end of the C16 and the early C17 are known (Oswald 1970c: 225; cf 1960a: 56-7; Atkinson and Oswald 1969: 178 fig 1,1, 177) - Atkinson (1972a: 42, 45 fig 1) notes rare examples from London, Cambridge, and Portsmouth.

There are also differences in colour and texture which may reflect the manufacturing process, or rather the preparation of the clay. Modern clay pipes generally have a very white appearance and a surface which suggests a very wet finish before drying, and many pipes last century have a definitely plaster-like appearance. In the C18 pipes appear to have been a little less white than do modern pipes (though this is difficult to state definitely when they have been smoked and then buried in the ground) and to be made from clay a little less pure. In the C17 the later feature seems a little more marked - generally this feature takes the form of a very slightly sandy texture. It is possible that these various features reflect an improvement in the cleaning and preparing of the clay, though it may be that they also reflect different beds of clay. The brittle, plaster-like, consistency of many C19 pipes was probably caused by the use of dryer clay: dryer clay would be stiffer and thus stronger and better able to withstand the rougher handling of mass-production, and as is noted later, when discussing clays, clays for moulding need not be as plastic as others, but do need to be firm. (One of the drawbacks to using English clay that Duhamel du Monceau notes is that it takes less solidification on moulding and thus is more likely to break while in an unfired state.) Dryer clay would involve less working prior to use, less stoving time, and probably less firing time and less delicate temperature raising, all of which would cut down production time and costs. Several of the patents registered in the second half of the C19 for mass-producing pipes by machinery stress that stiff clay was to be used (see above). The frequency with which the remains of mould lines appear on C19 products also suggests that quality was sacrificed to quantity and that trimming was often rather perfunctory - piece-work payment, which appears to have been the common practice, no doubt also led to a lower standard of craftsmanship. As Ashton notes (1955: 97, 1961 ed), the skilled artisan with an apprentice and a journeyman or two "flourished wherever close attention to detail and the maintenance of quality were of special account": as mass and cheap production of pipes took over the market the demand for quality-made and -finished pipes such as those produced earlier declined, and with this decline went that of the small manufacturer.

SECTION VIII:

METHODS USED IN THE UNITED STATES OF AMERICA

Virtually no study has yet been made of clay tobacco-pipes produced in the United States, but though conventional white ballclay pipes were produced, the characteristic type made was an earthenware pipe, sometimes glazed, made with a bowl and a stub stem, into which latter a reed or similar stem was inserted. This type of pipe was being produced at Bethabara, North Carolina, from 1755 in the "Moravian" community there, a community largely of central European origin. The potter who made these pipes and other items, Gottfried Aust, was born in 1722 at Heidersdorf (now Łagiewniki), ca.25 miles SSW of Breslau (now Wrocław) in Silesia, now part of southern Poland (not, as Bivins (1972: 16) says, part of Czechoslovakia), and learnt his trade at the Moravian community of Herrnhut near Zittau in East Germany, where now the boundaries of Germany, Poland, and Czechoslovakia meet, where he was apprenticed in 1743; and as similar pipes were being made in Poland by the end of the C17 and being fired in exactly the same manner known to have been used at Bethabara, it seems likely that the Bethabara tradition of pipe, which still exists in the SE United States, derives from an East-Central European tradition (see also 3: III; the evidence is discussed in I. Walker 1971a).

The earthenware stub-stemmed pipe tradition is quite different from that of the ballclay pipes of England and the derived tradition of the rest of Britain, the Low Countries, France, and the Westerwald and Brandenburg areas of Germany, but there are a number of interesting parallels with the English and English-derived traditions in the manufacture which are worth noting.

The only relatively detailed description of the manufacture of these pipes relates to the Pamplin area of Virginia (Hamilton and Hamilton 1972: 7-8, 11-12; Apschnikat 1972: 3, figs 3 and 4; Heite 1970a; W.A. Thompson 1969). The Pamplin Smoking Pipe and Manufacturing Company, Inc., claimed at least latterly in its advertising literature to have been founded in 1739 (e.g. Hamilton and Hamilton 1972: 9) - 16 years before the Bethabara industry - but the evidence is fairly clear (Hamilton and Hamilton *loc. cit.*) that the firm was established immediately prior to 1880 and was in fact a branch of the Akron Smoking Pipe Company of Ohio (see below, p.209). The company was dissolved in 1952 after a protracted period a-dying, the firm latterly buying pipes made by local women after the Minimum Wage Law made it impractical to manufacture the pipes at the factory. The factory itself was sold in 1947 (Hamilton and Hamilton *op cit.* 11), though at least as late as 1969 part of it, and the derelict 200,000-pipe capacity kiln, still stood (*ibid*. 11, 28 pl 4 and 29 pl 5).

However, the tradition of making this form of pipe in the Pamplin area apparently goes back far beyond the arrival of the Pamplin Smoking Pipe and Manufacturing Company, and while it may not have been learnt from the local Indians (W.A. Thompson 1969: 13; cf advertising material of the firm illustrated in Heite 1971: 196) - Thompson suggests this is "very questionable" - the Hamiltons (p.4) believe the local tradition that the industry started almost as soon as the first white settlers arrived in the area is correct, and that the industry was well under way by the 1740s. It certainly seems probable that the suitability of the local clay for working would have been quickly realized, though strangely there seems little evidence for items other than pipes ever being produced (though the 1929 charter of the Pamplin Company notes among a varied list of interests the manufacture of "crocks and earthenware" (Hamilton and Hamilton pp10-11)); and the settlement of the area, as the Hamiltons note (p.3), was well established by the 1740s. This home industry aspect of the trade continued until 1953, when the last woman maker died at the age of 95, having made 500 pipes in her last year (Hamilton and Hamilton p.4).

According to the Hamiltons (loc. cit.) the home industry was practically speaking entirely one of white women, but Thompson (1969: 13 and 15) says that negro slaves also produced pipes, recounting a local legend that they had learnt the trade "from an aged white man who lived as a hermit and supported himself by making pipes" and noting that just before the American Civil War, 1861-65, the slaves of "a rich, old indulgent bachelor" were allowed to operate quite a thriving business manufacturing and selling these pipes. After the Civil War, in which so many men had been killed, the trade became especially important among white women.

Interestingly, a fairly crude stub-stemmed pipe with primitive incised stem-decoration has recently been found in a rubbish-dump in coastal Virginia with material deposited ca.1730; it appears to have been made with the aid of metal tools (Heite 1970b). Heite notes this is one of the earliest-known contexts in Virginia for such a pipe, though so far there seems no compelling evidence to indicate the pipe was made by Europeans. Its presence in this context, nevertheless, would indicate a tradition of this pipe type this early. A full report on the context of this find is to be prepared.

The methods used to manufacture these pipes, whether in the home industry or in the more mechanized factory industry, were straightforward enough. The factory used two-piece metal moulds - one dating from the late C19 and early C20 is in the Smithsonian (Thomas and Burnett 1972: 10) - and a machine to mould the pipes which had been invented in the mid-1840s by Calvin Merrill of the Merrill Pottery near Akron, Ohio (C.D. Blair 1965: 3). Different moulds could be attached to the machine, and it is described as being "foot powered"; but unfortunately, although illustrations of this machine have twice appeared (Heite 1970a: 118; Hamilton and Hamilton 1972: 30 pl 6) and both the Hamiltons (p.11) and Apschnikat (1972: 2) talk of the machine as being foot-powered, it is not clear just how the machine did work: the Smithsonian describes the machine as having "a single metal block mold that opens to reveal the pipe shape and receive a ball of clay; when closed by a single action, plunger pins from the top and side enter the mold to form the bowl and stem openings" (quoted in Thomas and Burnett 1972: 10). The Smithsonian suggests (Thomas and Burnett loc. cit.; see also pp 209-10) that the metal moulds were possibly made in an Atlantic Coast factory, but at least some were made locally at Pamplin according to one informant, who claimed a local man "had a shop and made many molds" (quoted in Hamilton and Hamilton 1972: 11). This last, however, may have referred to the firm's later years, when equipment would have become increasingly hard to obtain. Another Smithsonian suggestion, that "Local producers could have built their own apparatuses to hold and operate the block molds" (quoted in Thomas and Burnett loc. cit.) might be true, again particularly for the later years.

In the home industry, however, no such machine was used, and the moulds were much more makeshift affairs made from a piece of oak split and hollowed out and filled with molten lead to about quarter of an inch from the two openings in the mould for the mouth and the stub stem. When cold, the lead was drilled and reamed into the form of the pipe. The quarter-inch gaps at the top of the bowl and stem were then filled with lead and openings carved so that tools to form the hollow bowl and stem could be inserted to the correct depth. The two parts of the mould were attached by an ordinary hinge; they were held together with two wooden pegs which fitted into holes in one half and when closed fitted into holes in the other, and by a hook attached to a screw to one half which fastened over a screw inserted in the other half.

The clay used was a local very fine red clay which was mixed with water and when at the right consistency - a smooth dough - was rolled into pieces "the shape of a rope" and then cut into required lengths, rather as in the present Westerwald industry. In the last years of the factory's operation "some white clay from either West Virginia or Kentucky was shipped in by railroad" (quoted in Hamilton and Hamilton 1972: 3) which produced pipes of a lighter colour, at times light grey to white. The small cylinders of clay were then placed in the mould which was closed, and in the home industry a tool called by Thompson a bowl-reamer was inserted and rotated into the bowl part of the mould. The bowl-reamer was of wood, shaped with a handle narrowing to a collar larger in diameter than the rest of the tool and with a straight or diagonal slot ca.1/4 ins in width cut in either side of the collar. Below the collar was a symmetrical finger which formed the inside of the pipe bowl. The excess clay was forced by the reamer into the space for moulding the stub stem (called by Thompson the "shank cavity", which may indicate the stub stem was termed the shank) and also out through the slots in the collar of the bowl-reamer.

With the bowl-reamer still in position the shank-reamer, a similar but smaller tool, was inserted into the shank cavity and rotated, forming the stem bore almost as far as the bowl. This tool was then removed and the mould opened. The bowl-reamer, still in position, was used to lift the pipe from the mould and the mould lines were removed and the pipe generally smoothed with a "hooked-scraper tool". This was a flattened metal rod or a flat piece of metal with a shallow hook at one end, fitted with a wooden handle; in appearance it resembles closely the Dutch and German shankers. The bowl- and shank-reamers, Thompson says, had many different names: the most common was "stick", which is reasonable enough in view of their being made of wood, though one would like to have had the other terms to see whether any connection to the European manufacturing tradition might be postulated. At this point any identifying name - ORIGINAL, GENUINE, FLORENCE, and HAYITI (see below) are all known from examples - was impressed on the stub stem. These names were also used on the factory-produced pipes, as were POWHATAN, CATLINS, 103, and 117; the last three were raised inscriptions, suggesting they were mould-imparted.

The pipes, still with the bowl-reamer in position, were then either sun-dried on a board in summer or dried in a stove oven in winter. When this was finished the pipes were said to have "set-up". As they dried the reamer became free and was removed, and a piece of wire was pushed through the shank cavity to complete the bore into the bowl. Firing followed. At the factory, this was done in a large circular kiln (Hamilton and Hamilton 1972: 29 pl 5) which had a capacity of 200,000 pipes. The pipes were fired in circular, bottomed, fireclay saggars with holes irregularly places in the sides and bottom (Hamilton and Hamilton *op. cit.* 31 pl 7), the firing lasting for 24 to 48 hrs. The fuel used is not stated. On occasion the pipes were salt-glazed, the salt being thrown through an opening in the top of the kiln. The home industry, however, used a much more primitive method of firing, simply placing the set-up pipes in a cast-iron pot which was covered in split seasoned chestnut wood - used because it would not smoke - which was fired by fine kindling wood. The pot was allowed to cool after it had become cherry-red, and when the pipes had cooled they were coated with beeswax and mutton tallow and then polished with a woollen cloth. Black pipes are known from the home industry: the Hamiltons (1972: 6) suggest these were obtained by allowing burning wood from the fire to fall into the iron pot which acted as the saggar, and undoubtedly something like this - firing the pipes with wood or sawdust in the pot (cf pp 94, 117 above) - must have been used.

Stems 5 ins and 10 ins long were made of reed - a native variety of bamboo, *Arundinaria gigantea* - and at least latterly most came from the Dismal Swamp in SE Virginia (cf Caywood 1955a: 59), where they were cut in 12-ft lengths by men in boats, left to dry for six months, cut into shorter lengths, and reamed out. They were then tapered to fit the pipe shank and secured with a cork or something similar; some were put in a machine and bent. A high-pressure mill extruded the cork, which was cut off with a wire. In some cases a metal ferrule, apparently of brass, was used to attach the stem (Hamilton and Hamilton 1972: 19), but this may have been to take a more conventional stem similar to that on a brier pipe, for the type of pipe on which this ferrule was found (*ibid*. 44 pl 20,AA), and also several other types (*ibid*. 40 pl 16,L, 42 pl 18,S, 45 pl 21, AB-AE; cf Heite 1972a: 211, 212 figs 7 and 12), do not appear to be suitable for taking a reed stem - indeed, the Hamiltons suggest (p.19) that two of the pipe styles they illustrate (45 pl 21,AD and AE) may have been conventionally-stemmed clay pipes, though if so, and if Pamplin products, theymust have been very rare. In the days when Pamplin pipes were shipped to other parts of the United States and abroad they were packed in barrels in alternating layers of pine-needles (also known as pine-straw and pine-tags), or in sawdust.

An unopened box from the Pamplin factory contained two pipes complete with their reed stems and two spare reed stems, together with a leaflet describing the pipes in rather fanciful terms. In this instance the stems were 10 ins long (Heite 1971). These pipes, which had POWHATAN on the front of the bowl and ORIGINAL on the side of the stub stem, must represent the last Pamplin products. The stems were fitted to the pipes with small cork bands.

Terminology for pipe types is not entirely clear, but one key, apparently not discovered by the Hamiltons, is that earthenware bowls were called "hamburgs" and stoneware bowls "shakers" (Heite 1972a: 211). (Whether there is any connection between this latter term and the production of pottery pipes from before 1800 in a Shaker community in Massachusetts (L.W. Watkins 1950: 93) is unknown; a 1795 reference to these Massachusetts pipes incidentally, notes that the term "stail" was used there for the reed stem which went with the pipes, but no special term for the stem appears to have been recorded so far elsewhere.) According to Thompson (1969: 17), the home industry pipes fell into two categories, the "Zuvee", with a plain, slightly conical, bowl and stub stem; and the "Original", with a plain cylindrical body and an octagonal stem, which came in three sizes - small, medium, and large. In fact, the Pamplin home industry appears to have produced four styles marked ORIGINAL (one of them alternatively marked FLORENCE); and two of these, including the Florence style, were also produced by the Pamplin factory. In addition the home industry also produced a type marked GENUINE and another marked HAYITI, which latter the factory also produced,[32] and the factory produced a type marked POWHATAN. Further, the factory also produced a type marked CATLINS, and two others bearing the numbers 103 and 117 (Hamilton and Hamilton 1972: 15).

Specific names used by the factory and recorded by the Hamiltons (passim) were "Akron Hamburg", "Akron Shaker", "Ole Virginny Shaker", "Powow Shaker", "Wigwam Shaker", "Powhatan Original", and "Tomahawk". The term "Akron" is no doubt an allusion to the Company's Ohio origins and possibly represents a bowl-form brought from there; the "Akron Shaker" was produced for a time in later years, at least by 1941, and was similar in form and decoration to the "Akron Hamburg" but made of fireclay, suggesting the difference between Hamburg and Shaker pipes given by Heite is essentially correct and that it is a difference in body, not form. The "Powow Shaker" was similar, save for a single small rounded band of beading near the bowl lip, to the HAYITI-marked bowl referred to above. The "Powhatan Original" was not the same as that marked POWHATAN referred to above: this last was a version of the firm's novelty pipe, of which their "Tomahawk" was another version, the bowl being in the shape of a tomahawk blade - which naturally reduced its practicality - and in the case of the POWHATAN-marked pipe with a likeness of Washington on the right side surmounted by the name WASHINGTON raised and on the left side the likeness of an Indian in Plains head-dress with POWHATAN in raised letters above.

As the Hamiltons indicate (p.23), it is likely that when the factory arrived in Pamplin immediately before 1880 it adopted the local Original bowl form and also added the term Powhatan to its advertising, probably adding the former term to three other bowl forms subsequently. Thompson (1969: 17) says that the appearance of the mark ORIGINAL on Pamplin pipes was a later addition to pipes of this form, the earlier having been unmarked; the mark had certainly appeared by the 1870s, for bowls marked thus have occurred at Fort Stambaugh, Wyoming, occupied 1870-78 (R.L. Wilson 1971: 49-50, 80 fig 38), and also at Fort Sully, North Dakota, occupied 1866-94 (R.L. Wilson 1971: 50-51, 80 fig 39,C). At Fort Laramie, Wyoming, occupied 1834-1938, a Pamplin pipe marked POWHATAN on one side and ORIGINAL on the other was found (R.L. Wilson 1961: 125, 124 pl II,1; 1971: 10-11, 61 fig 5,C); however, this may be a late example, particularly in view of the late occupation of the site, as this double use of words - albeit with the POWHATAN on the bowl - occurs on the last products of the factory (see above) and in the final years when the factory was selling home-made pipes an identification tag with the heading "This Is An 'Original' Powhatan Pipe" was used (Hamilton and Hamilton 1972: 14, 36 pl 12). However, the term Powhatan, like the term Original, was certainly in use well back into the C19, for a box of Pamplin-made pipes was found in the wreck of the Bertrand which sank in the Missouri in Nebraska in 1865, the pipes being destined for a firm in Virginia City, Montana, and carrying the identification on their box THE CELEBRATED VIRGINIA POWHATAN (CLAY), J.R. FRANKLIN & CO., SOLE AGENTS FOR THE MANUFACTURERS, PAMPLIN DEPOT, APPOMATTOX COUNTY, VA. (quoted in Hamilton and Hamilton p.5) - Pamplin, originally called Merriman's Shop, had been renamed Pamplin Depot in 1854, becoming subsequently Pamplin City and finally simply Pamplin (Petsche (1974: 72) in giving the inscription has POHATAN and PAMPLINS DEPOT for POWHATAN and PAMPLIN DEPOT: both these spellings would appear to be inaccurate, but whether the error lies in Petsche's quotation or in the original inscription is unclear). The 95-year old woman noted earlier who made pipes until her death in 1953 claimed that the "Powhatan 'Original'", "Hamburg", and "Zuvee" or "Zoo" forms were some of the first pipe forms in the area (Hamilton and Hamilton p.6); bearing in mind that Hamburg referred to pipes of a certain firing, i.e. stoneware, or at least to a different clay body and not to a specific bowl shape, this claim seems reasonable - presumably the use of the term Original would have become necessary only when a second form, presumably the Zuvee, began to be produced. If so, the Zuvee must have been introduced by the 1870s, for as noted above Original-marked bowls have occurred in an archaeological context of 1870-78. The Hamiltons (p.3) found 12 different sizes of the Powhatan 'Original', suggesting it may have been either the oldest form, or the most popular, or quite possibly both.

The extent of Pamplin trade has yet to be examined - last century stub-stemmed pipes spread widely in the United States and occasionally into Canada(see pp 314-16), but how many were Pamplin-produced has still to be determined - but certainly it was widespread. Apart from the specific instances noted above of Pamplin trade to North Dakota, Wyoming, and Montana, an 89-year old Pamplin woman recalls local women trading their pipes for goods at her father's general store and that her father sent the pipes to wholesale houses from where

> they were shipped to the Cotton States and to the West. Large orders were filled for a tobacco factory in Pennsylvania, where they sold bags of tobacco with the pipes (quoted in Hamilton and Hamilton p.6).

About 1956-58 this woman and a neighbour dug up some of these pipes from the site of the store basement, sending some to a person in Atlanta, Georgia, who had happened to comment to her that these pipes were now unobtainable (Hamilton and Hamilton p.7). Further, it is said that at one time these pipes were shipped to Britain and certain countries in Europe (Hamilton and Hamilton p.10); indeed, according to Apschnikat (1972: 2) the factory "ceased to exist in the early 1940's [sic - as indicated above, it continued, albeit in a moribund state, until 1952] because WW II stopped planned shipments overseas and markets weakened".

(Sprague (1937: 1-2) illustrates a Pamplin-style mould and the two reamers - but not the scraper - and notes that the moulds he had seen were not hinged. His article unfortunately attempts to combine descriptions of American moulds with accounts of pipemaking from seven different C19 encyclopaedia sources, themselves of varying accuracy and based on both British and Continental practices (cf remarks on encyclopaedia accounts in the previous section).)

Although the pipe products of Aust and his two sequential successors at Bethabara, Rudolph Christ and Gottlob Krause, have been studied in detail (South 1965; 1967: 35, 49-50), few references have been found on their manufacture. An inventory of 1766 lists Aust with a tobacco pipe press and eight moulds, seven of which appear to be represented in the material found. In 1772, the year after Aust had moved to nearby Salem, an inventory listed him as having three lead moulds and one of brass, suggesting he possibly left four moulds for Christ. The pipe-fragments excavated indicate these moulds were bipartite, and while there are no detailed descriptions of the moulds or presses used at Bethabara, undoubtedly they would have been the same as the C19 and late C18 material recorded by Albright (1958) and Bivins (1972: 96-8, 175 fig 155) at Salem. Here again, lead or pewter and brass moulds (the composition of the last varying almost to bronze) were used. The two halves of the mould were fastened to each other with wooden or metal pegs set in one half and aligned to enter holes in the other half. Almost all the moulds described by Albright had brass, bronze, or iron plates screwed or soldered to the bowl rim; two had similar plates on the stem end. Thomas and Burnett (1972: 10-11) describe two moulds from South Carolina which were probably poorer versions of those described above, being made of soapstone and lead or pewter. These moulds came with two wooden handmade plungers to form the bowl-and-stem openings, and a wooden form was used to hold the two parts of the mould together when in use. The Bethabara moulds were clamped in vices, which could either be an ordinary carpenter's vice or a quite elaborate instrument, the equivalent of the chest and head and handle of the English industry but entirely different in form; they are called by Albright reamer vices, but Bivins, perhaps more accurately, calls them pipe presses - a 1793 inventory of Christ listed one valued at £12. This instrument comprises a block of wood about one ft long and 4 by 5 ins in section surmounted by a wooden or metal frame. In the centre of the block is a niche ca.2-1/4 ins cube cut out of one top edge to take the mould, which is clamped in position by a threaded crank at the right side of the block. Thumb-screws at the back and on the left side of the block centre the mould under the frame which holds the wooden or metal plunger or reamer which forms the bowl. This is on the end of a T-shaped handle; occasionally, as on the example illustrated in Albright 1958: 20 fig 4,e and Bivins 1972: 97 fig 30, the handle shaft was threaded - Bivins dates this example to the late C18.

A lump of clay was placed in the mould prior to its being put in the vice, the mould having been first greased. The reamer was turned a few times, the excess clay was scraped off the stem end (where presumably it had been forced out by the plunger) and another plunger, called a "peg", of wood or iron and with a wooden handle was inserted to form the stem. The reamers were then withdrawn and the stem bore completed with a wire attached to a wooden handle, and the pipe was removed from the mould and hung on a peg board to dry (cf Bivins 1972: 98 fig 31).

Of the five presses illustrated by Albright three are described as probably mid-C19 and the two better presses are dated to the C18. If this is correct then it may be assumed Aust's press was of this latter kind: whether the style was brought from Central Europe or not is unknown, but it bears no resemblance to pipe presses used in England; and the Dutch, Germans, and French did not use presses.

An examination of the cross-sections through Aust's pipes (South 1967: 50 fig 10) suggests he produced them in the above fashion - it appears, for example, that a wire or similar tool of lesser diameter than the bore of the stub stem was used to effect the junction of the stem bore and the bowl after each of the latter had already been formed (the "borer" used by Pollock's for this purpose for their stub-stemmed pipes).

The pipes were fired hanging on their bowls from clay pins which were fastened either to the outside of a cylindrical clay saggar or to the inside of cylindrical saggars which had a series of stepped-out shelves (South 1965: 52 illus; 1967: 49 fig 9, three illus on rt; Bivins 1972: 103 figs 38-9). Most of the pipes were unglazed, but about a quarter of those found in the excavation were black-, brown-, green-, mottle-, or clear-glazed (inventory figures for the end of the C18 and the early C19 (Albright 1958: 18) also indicate most pipes made were unglazed).

According to South, the saggar pins were made in two pieces and fitted together, but it seems likely that the "joint" is simply the mould-line from a bipartite mould (according to Bivins (1972: 103), the pins for the pipe-saggars were often simply rolled out by hand; a bipartite plaster mould was used to make the larger, stronger pins for supporting plates in the plate-saggars (1972: 102, figs 37 and 34).) The firing of pipes on pins attached to the outside of a vessel is recorded in the presumptively ancestral Polish material (Świechowska and Dukwicza 1955: 154-5 and pls 17-20). (These Polish pipes were made in bipartite clay or wooden moulds, and a yellow or green glaze was apparently standard. Unlike the Bethabara material, most of which was anthropomorphic, the Polish material was plain, though two examples bore a simple flower.)

Little is known about the actual firing techniques or the type of kiln used, but wood was the fuel used - in 1764 it was noted that Aust particularly liked oak "because it makes few coals and burns almost entirely to ashes" - and the kilns were almost certainly beehive-shaped updraught kilns (Bivins 1972: 86). Being of earthenware, the pipes would undoubtedly have been fired in the same manner and at the same time as normal earthenware products; for special products, such as Aust's creamware and Christ's tin-glazed earthenware and possibly his salt-glazed stoneware, special kilns were built (Bivins 1972: 87-9).

After firing, the pipes were ready to take reed stems. These stems, which were made from reeds found locally along the stream banks, were supplied with the pipes in many cases; but providing them does not appear to have been always the pipemaker's responsibility, an 1806 reference for example noting that a former pottery-worker was engaged in providing reed stems for one of the Philadelphia firms to which the Salem pottery sold their pipes and was wondering "whether any or all of his Stems & reeds were sold" (Bivins 1972: 174).

Albright also describes how the moulds were made. An iron pattern was placed on its side in sand and buried to half its depth. A metal dam was placed around it and the metal poured over it to the necessary thickness. The process was repeated for the other half. Plaster moulds are also known. Albright suggests they were probably not used when large quantities of pipes were needed, for although these moulds were easy and quick to make they could not be used in the press and in any case would wear out quickly. He notes two examples where there were no opening for reaming: these he suggests were used by pressing clay into one half with the thumb and then closing the mould, a relatively slow process which was commonly used at Salem to produce small, fancy pottery bottles. It seems more probable to this writer, however, that these plaster moulds were used as forms to produce the metal blanks necessary in the manufacture of new metal moulds. Certainly, one would not expect plaster moulds to be used in any process which necessitated vigorous handling such as the use of the reamers: not only would the moulds break in no time but pieces of plaster would flake off, and if mixed with the clay would be disastrous when the pipes were fired. Plaster forms, as already noted, are used at Gouda to produce the blanks for new metal moulds.

Besides South Carolina and Virginia, a third major area of production of stub-stemmed pipes appears to have been Ohio. Germans from Bucks County, Pennsylvania, where stub-stemmed pipes are known to have been made and which is adjacent to the Moravian settlement of Bethlehem founded in 1741 (I. Walker 1971a: 29) where Aust actually worked in the pottery for ca.10 months in 1754-55 before going to Bethabara (Bivins 1972: 17), settled in Ohio; and it is tempting to suggest that the Ohio industry, which was certainly quite widespread (C.D. Blair 1965: *passim*; Thomas and Burnett 1972; Murphy and Reich 1973), also derived from Moravian traditions. No systematic work has yet been done on Ohio stub-stemmed pipes, but as noted above (p.201), the Pamplin Smoking Pipe and Manufacturing Company established at Pamplin, Virginia, immediately before 1880 was a branch of the Akron Smoking Pipe Company of Ohio, suggesting the Pamplin factory method of production outlined earlier (pp202-4) would have been that used in Ohio; and Thomas and Burnett's excavation and research on an 1840s-1880s kiln site at Point Pleasant, ca.25 miles SE of Cincinnati in the extreme south of the state, where these pipes had been produced, also give some idea of Ohio manufacturing methods.

At Point Pleasant, the clay was "seasoned" - i.e. macerated - after being procured. Two-piece moulds were used, but none were found on the site. The reminiscences of a local octogenarian suggested they were two-piece iron moulds, two wooden plungers being used to form the bowl and stem openings. According to this informant, two long wooden levers were also used, but how and on what could no longer be remembered. This description, vague though it is, indicates some semi-mechanical device was used, and it is possible it was a machine of the foot-operated type used at Pamplin; like that machine, it evidently took metal moulds. A member of the Smithsonian staff suggested that "block molds were made, perhaps in an

Atantic Coast factory and then supplied to pipe making firms such as the one in Virginia [Pamplin] and possibly [the Point Pleasant site] in Ohio"; but as noted when discussing the Pamplin firm's production methods, at least some of their moulds were made locally, though this could have been a feature of later times, as sources of supplies dried up. The moulded pipes were allowed to dry for a time, then put - evidently in no order, to judge by a saggarful found in the excavations - in large perforated saggars, which were separated from each other by spacers. Illustrations (Thomas and Burnett 1972, 17 fig 4; Hamilton and Hamilton 1972: 31 pl 7) suggest the Point Pleasant and Pamplin saggars were essentially identical. Four fires, one at each corner (sic) of the kiln, were said to have been used, wood being the principal fuel. When a salt glaze was required salt was shovelled on to the fires towards the end of the firing, although fly-ash glazing may have been used to fire the pipes found. At Pamplin, as already noted, salt-glazing was effected by throwing in the salt from the top of the kiln; this may represent a different tradition, but effectively the two techniques are the same.

The stub-stemmed pipes found in a refuse-dump at Mogadore on the ESE limits of Akron by Murphy and Reich (1973) are probably products of the Akron Smoking Pipe Company which worked at Mogadore 1885-ca.1895, succeeding Fenton and Company who were in business 1883-85. By coincidence, the Akron Smoking Pipe Company also had a factory at Point Pleasant which continued in production until 1908; and apart from being the parent of the Pamplin Smoking Pipe and Manufacturing Company they also had another Virginia factory, at Hampton, which suggests the firm was an unusually large one. The Mogadore dump pipes are particularly interesting because the majority have letters or symbols raised on the bottom inside the bowl. If, as Murphy and Reich suggest, these are marks identifying Mogadore-produced pipes, they will provide a most useful means of establishing trade patterns (see pp313-14 below; see also now I. Walker 1975a).

SECTION IX:
PIPEMAKING CLAYS AND THEIR PROPERTIES

A discussion of the geology or geochemistry of clay would be an extremely complex project, and one far beyond bounds of this thesis. The fields themselves are not by any means wholly understood, to judge by published material. To quote Dienemann and Burre (1928: 32):

> Theory and practice in various countries have not yet established accurate specifications and classification of kaolins and clays based on their technically most significant properties. Many proposals have been made but none has gained general acceptance

and immediately preceding this

> Thus, for instance, 'stoneware clay' may be found at several different sites and even varies in technical properties from layer to layer of the same site. Determination of clay catagories based on their properties is therefore neither conclusive nor exhaustive.

Cardew's Pioneer Pottery (1969) is the most up-to-date technical survey of these fields from the point of view of ceramics manufacture, though much of it is too technical for this writer to follow easily. A good example of pragmatic description of clays is quoted in Shaw's History of the Staffordshire Potteries of 1829, part of which is as follows (S. Shaw 1829: 100, 1970 ed):

> Alluvial Clay contains a large proportion of quartz sand, and rounded pebbles of various kinds, showing it to have been carried from its native situation, and mingled in its process with a variety of extraneous bodies. Three kinds may be distinguished; viz. Pipe clay, potter's clay, and chalky clay. Pipe clay is of a greyish or yellowish white colour, an earthy fracture, and a smooth greasy feel: it adheres to the tongue; is very plastic and tenacious; is with difficulty fusible, though much more so than porcelain clay [described earlier], from which it is further distinguished by superior plasticity, and containing sand. It is manufactured into tobacco-pipes, and is the basis of the white or queen's-ware pottery. - Potter's clay is red, blue, or green; with a fine earthy fracture, and a soft, often greasy, feel; it adheres to the tongue, and is very plastic; burns to a hard, porous, red brick; and in a higher heat runs into a dark-coloured slag. When tempered with water, and mixed with sand, it is manufactured into bricks: the varieties most free from pebbles, are made into tiles and coarse red pottery. - Aiken.

Clay may be defined as an earthy mineral substance composed largely of a hydrous silicate of alumina, which becomes plastic when wet and hard and rock-like when fired. The more alumina and water, and the less silica and other oxides (especially iron), the purer the clay. For example, the following percentages by weight (Rhodes 1957: 5) relate to the surface of the earth as a whole; common red clay; and North Carolina kaolin, a clay composed almost entirely of kaolinite, a hydrated silicate of aluminium:

	Surface of earth	Red Clay	Kaolin
SiO_2	59.14	57.02	46.18
Al_2O_3	15.34	19.15	38.38
Fe_2O_3	6.88	6.70	0.57
H_2O	1.15	3.45	13.28

The theoretical composition of kaolin according to one source (Enc. Brit. 1960 ed: vol 5, 553) is 46.3% silica (silicon dioxide), 39.8% alumina (aluminium oxide), and 13.9% water; Cardew (1969: 19) who is probably more reliable, gives 46.5% silica, 39.5% alumina, and 14.0% water.

Clays may be classified either as primary or as secondary clays. The former, also known as residual clays, are formed in situ: one belief is that these clays were formed by ground water seeping through the rock and leaching out the more soluble components (so Rhodes 1957, 1973 ed) but another theory, at least for the origin of kaolin, a primary clay, suggests they are formed principally by hot aqueous solutions containing carbonic acid and compounds of boron and fluorine probably from a "hydrothermal" phase when they accumulated within the granite at a late stage in its cooling and consolidation (so Searle and Grimshaw 1924, 1959 ed; Adams 1961). These alternatives are not new - Fleming (1923: 39) refers to them; Cardew, discussing these theories (1969: 14-15), notes that the first and older theory, known as "deep weathering", has been abandoned as an explanation of at least the Cornish china clay in favour of the second, known as "hypogene" or "pneumatolytic" action. Certainly, kaolin is formed from the natural decomposition of feldspar, which is one of the principal mineral constituents of granite igneous rocks. Primary clays are very much less common than secondary clays, whose components have been transported, generally by water but also by glaciers or wind, to another site.

In typical deposits of primary clay, much unaltered rock remains and the clay is found in irregular pockets. Because it has not had the grinding or sorting effect on its particles that secondary clay has, primary clay is unsorted, relatively coarse-grained, and relatively unplastic. Once clear of rock inclusions, however, it is quite pure and free from non-clay contaminants, partly because most primary clay is formed from more or less pure feldspar, which is relatively easily broken down by water; and partly because not being stream-, glacier-, or wind-carried there is no opportunity for contaminants, either mineral or organic, to enter. Most kaolins are primary clays. Surface-weathered kaolins invariably have more iron-bearing minerals and thus tend to have brown, red, or pink tinges when fired.

Ballclays, on the other hand - defined by Searle and Grimshaw (1924: 295-7, 1959 ed) as clays which are sticky and plastic (i.e. easily worked) and burn white - are secondary clays, and thus in one way the opposite of kaolins, though they too originate in the natural decomposition of feldspathic igneous rock. According to Cardew (1969: 17), English ballclays are exceptional in that they seem to have been formed not by the slow kaolinization of feldspars through the ages by surface weathering but come from a washing-out of originally primary kaolin formed as noted earlier by pneumatolysis of Cornish grantite. This washed-out material was deposited in the Peter's Marland district of North Devon, the Bovey Tracy area of South Devon, and round Wareham and Poole in Dorset (FIG 120). These clays are unusually pure, though a considerable amount of woody material entered South Devon clays to become preserved as lignite and the Dorset clay, having been transported further, has become more diversified though sometimes less pure. According to Holdridge (1956: 369) the North and South Devon ballclays are in all probability lacustrine, whereas the Dorset ballclays may well be estuarine. Further, although the dates of these deposits are in doubt, the Dorset clays are much older than either of the other deposits (Holdridge 1956: 369-70). The only other major source of ballclays in Britain is in the neighbourhood of Lough Neagh in Northern Ireland, but these deposits contain too much iron to make them useable in the manufacture of white wares, though the lower deposits are often extremely plastic (A.R. Scott 1929: 2-3; cf below).

Ballclays have considerable variation in their composition, but compared to kaolin they tend to have a higher percentage by weight of silica and a lower percentage of alumina; they also have relatively large amounts of alkalines, iron oxide, and carbonaceous material. However, the amount of iron in ballclays and some secondary kaolins is exceptionally low for secondary clays. Kelso and Thorley (1943: 88) give the following typical analyses for kaolin and ballclay:

	kaolin	ballclay
SiO_2	45.00	49.99
Al_2O_3	40.25	32.11
Fe_2O_3	0.35	2.34
NaK_2O	0.81	3.31
CaO	-	0.43
MgO	-	0.22
H_2O	13.70	11.70

The following table compares analyses of a typical Wareham ballclay (figures from H. Powell 1968: 26) and the "blue" ballclay from South Devon (figures from Cardew 1969: 19, quoting A.R. Scott 1929), the already-quoted figures for North Carolina kaolin being added for comparison (a series of analyses of various English kaolins is given in Howe 1914: 195-7, one table (p. 197) comparing a ballclay and a kaolin clay; analyses of kaolins from a large number of other countries are also listed (pp197-226).

	Wareham	South Devon	North Carolina kaolin
SiO_2	50.76	45.60	46.18
Al_2O_3	33.52	35.48	38.38
titanium and iron	2.25	1.96*	0.57 - iron only
alkali	4.31	not given	not given

*iron 1.25

Ballclays - so called because they were originally mined in cubes or "balls" ca.10 ins across and weighing 30-35 lb (A.R. Scott 1929: 17) - are plastic, and much finer-grained than kaolin; the South Devon ballclays are composed chiefly of kaolinite, but the mineral is of a much finer particle-size than that of china clay. North Devon clays have a clay mineral of the livesite type which is fine-grained and thus plastic; and they contain more iron than do those of South Devon. The Dorset ballclays also appear to contain a kaolin mineral akin to livesite (Searle and Grimshaw 1924: 296, also 127-8, 1959 ed).

According to Holdridge (1956: 434-6) the whitest-firing ballclays come from South Devon and tend to be the "blue" clays (referring to their natural colour). The South Devon "black" clays, which contain more lignitic material, generally fire creamy-white. North Devon ballclays fire pale ivory or ivory, while Dorset ballclays fire to colours ranging from ivory through buff to red and in samples with very high kaolinite content a peculiar greyish-blue. The generally deeper colour of North Devon and Dorset ballclays relates to their generally higher TiO (titanium) and Fe O (iron) content. However, the effect of the iron depends on its grain-size and distribution, on the presence of lime or magnesia as a bleaching agent, and on the presence of lignitic material for example in the South Devon ballclay which tends to reduce ferric iron to ferrous and so lighten the colour (A.R. Scott 1929: 52-3, 1-2). As regards plasticity, Holdridge notes (1956: 405-8) that Dorset clays are the most plastic, that in South Devon the "black" clays tend to be more plastic than the blue (but that this does not hold good with the Dorset blue and black clays), and that siliceous clays (those with more than 60% SiO_2) generally have low plasticity values. In grain size (Holdridge 1956: 404-5) Dorset ballclay is the finest, followed by North Devon, and then by South Devon. The strongest ballclays, however, come from North Devon, with Dorset clays next and South Devon clays last. Within each group, black clays are stronger than blue - this is particularly noticeable among the South Devon ballclays (Holdridge 1956: 412-7). From these observations, therefore, it is clear that the ballclays from each area have their own characteristics, and indeed that there is considerable variation within samples from the same area (cf Holland 1958: 83). One Wareham firm lists 11 grades of ballclay (H. Powell 1968: 26), and no doubt early users of these clays were empirically aware of these characteristics. According to Adams (1961: 5), stoneware clays are the darker-burning and more siliceous varieties of ballclays - H. Powell (1968: 26-7) notes that some are more vitreous or fusible according to the silica and alumina content, and notes a stoneware clay from near Burton upon Trent in Staffordshire with a silica content of 59% and an alumina content of 25%. (For more technical comparisons among ballclays from the three main geographical areas noted above see A.R. Scott (1929) and Holdridge (1956).)

According to Searle and Grimshaw (1924: 297, 1959 ed), it is difficult to find better ballclays than those mined in England, a statement which is of interest when C18 comparisons of ballclays from various sources are compared for their suitability in clay pipe manufacture (see below).

In mixing clay or removing its impurities, the clay should be added to a relatively large amount of water, rather than the water to clay - this ensures the clay is thoroughly wetted and does not become a sticky partly-wet partly-dry mass. A blunger (a mixing machine with slow-turning paddles) can be used to keep the clay continuously but not violently agitated, or a relatively fast propeller on a mixer can be used. If the clay is lumpy, as one would expect when it is dug out of the ground, the blunger is to be preferred. Mixing with a paddle or stick is faster than might be supposed.

The fluid "slip" thus formed can then be passed through a mesh screen: with most clays a 60-mesh screen is sufficient to remove impurities, but for porcelain or other high-class whiteware a 100-mesh screen or one finer may be used. There are a large number of ways of removing the excess water, depending on the amount of clay, equipment available, and time available.

Aging most clays improves their workability, partly because the bacteria working in the clay develop organic compounds which improve the plasticity of it, and probably partly because the clay needs a considerable time to become thoroughly soaked. How long clay should be aged to achieve these beneficial effects appears from the literature to be a matter of opinion. Finally, the clay is kneaded and "wedged" (cut and thrown or hit) to remove air-bubbles. This is now often done in a pug-mill.

When plastic clay dries, it shrinks by approximately five per cent; some very plastic clays shrink by as much as eight per cent. Dry clay absorbs a considerable amount of water - an average clay requires about 35 parts to each 100 parts (by weight) to become plastic enough for modelling.

Shrinkage is greater in fine-grain clays because they hold more water: thus plasticity and shrinkage go together, for example in ballclay. Grog (fired and ground-up clay) is added to give "open" bodies, as it absorbs little water and is easily dried out, and this reduces shrinkage. Flint and feldspar are also used to achieve this.

During the firing process, the uncombined water is driven off by the time the temperature reaches 100°C; and at ca.350°C the chemically combined water begins to be driven off. By ca.500°C this is finished, and the clay is dehydrated and not usable again for any reshaping (it is, however, very friable). At 573°C quartz crystals, of which there is an appreciable amount in clay, either naturally or through adding flint, undergo what is called a change from alpha to beta quartz. This involves a rearranging of the quartz crystals and a slight (approximately two per cent) increase in volume. (The process is reversed when cooling through this temperature, and heating and cooling at this point have to be done carefully, particularly with large objects or if the kiln does not fire very evenly, to avoid cracking (called "dunting") when it occurs during cooling). By ca.900°C the oxidization of organic material, such as carbon, and inorganic carbonates or sulphates, is complete.

Vitrification is the hardening, tightening, and finally the glassification of the clay. The temperature at which this happens varies widely depending on the clay. Common red clay fires to hardness and density ca.1,000°C and melts ca.1,250°C. According to Rhodes (1957: 20, 1973 ed) ballclays generally tighten to a dense structure ca.1,300°C, but because ballclays cover a variety of types their characteristics vary, and A.R. Scott (1929:61-3) discusses and shows in graphs porosity at various temperatures for four types of clay - South Devon black, South Devon blue, Dorset blue, and North Devon blue. Vitrification of all save the South Devon black commences at 940°C, at which temperature the Dorset blue is slightly more porous than the North Devon blue and the South Devon blue slightly more porous than the Dorset blue. The porosity of all three however, are between 33% and 39%. The three vary somewhat in porosity as temperature is increased, the South Devon blue clearly retaining its porosity better than the others. By the time 1,100°C is reached the Dorset and North Devon blues have lost virtually all their porosity, and though South Devon blue at this point still has some five per cent porosity, by the time 1,125°C is reached all three have a porosity of under half of one per cent. With South Devon black, however, the situation is quite different: vitrification does not begin until after 980°C is reached, at which temperature its porosity is still 43%, and it then proceeds rather less quickly than in the case of the three other clays, total lack of porosity not occurring until 1,240°C has been reached. (According to Cardew (1969: 306), ballclays vitrify in the range 1,100°C-1,200°C, some (p.291) vitrifying completely as low as 1,100°C apparently because of the presence of very fine mica crystals.)

Firing beyond the temperatures noted by A.R. Scott leads eventually to softening - this occurs at temperatures ranging from 1,670°C to beyond 1,770°C depending on the type of ballclay (A.R. Scott 1929: 64). Kaolin, on the other hand, can still be open and porous at 1,250°C, and does not melt until temperatures beyond 1,800°C have been reached (Rhodes 1957: 20, 1973 ed), which is one reason why even porcelain is not made from pure kaolin, but has a "flux" (see below) added to lower the maturing temperature. According to Cardew (1969: 306), the maturing range for hard porcelain is 1,320-1,450°C. This process involves a shrinkage which can be as high as 10% depending on the degree of vitrification.

Ballclays have a shrinkage of up to 20% when fired to maturity, hence are rarely used by themselves in pottery. English ballclay is highly plastic (partly because it contains a large amount of carbonaceous material, the cause of its dark colour), and is free of iron. Kaolin's chief drawback is its high firing-temperature, and to make it workable in pottery various additions are made. Feldspar is added as a "flux", a substance which lowers the vitrification point, in this case to ca.1,300°C; flint is added to give hardness and resist warping (it also helps to "fit the glaze" - to match the firing characteristics of glaze and body); and ballclay is added to increase plasticity (though it decreases the whiteness of the kaolin).

Chinese kaolin was unusually plastic and needed no addition of ballclay, hence the translucent white achieved in Chinese porcelain. A typical modern porcelain composition would be five parts kaolin, three parts feldspar, two parts flint, and one part ballclay. (Howe (1914: 140-1) lists a large number of ceramic bodies using kaolin, and gives the proportions of kaolin and other substances.)

Clays to be pressed in a mould do not need to be as plastic as clays for wheel-thrown or hand-shaped vessels: they have to be strong enough to retain their shape.

Rhodes (1957: 65, 1973 ed) states lime is extremely difficult to extract from clay, and that its presence is disastrous because when fired it changes from calcium carbonate to calcium oxide which hydrates - takes on water - and swells (cf Randall 1877: 18; Holland 1958: 5, 82-3; G. Lewis 1970: 2nd page). Duhamel du Monceau writing two centuries earlier (1771: 13), also noted a contaminant which had to be prevented in clay to be used for pipemaking was lime from the storehouse walls.

However, the presence of calcium is certainly tolerable, for there is quite a range of calcareous earthenware; and a calcareous body is advantageous in the making of tin-glaze ware as the glaze on this body is less subject to crazing (the formation of a network of cracks caused by the shrinkage of the glaze to a greater degree than that of the body) (Charleston *in litt.* 25 March 1968, quoting *Encyclopaedia of the Ceramic Industries* by Alfred B. Searle). Fleming (1923: 47, 83), while not a reliable source, also talks of calcareous clays for making tin-glazed earthenware.[33] Calcareous East Anglian marls were used by London tin-glaze potters because, according to Edwards (Weatherill and Edwards 1972: 173), its leanness and high lime content corrected the excessive shrinkage in firing of the other clays used; in the C17 Dutch delft-potters were using Norfolk clay to mix others (quoted in Ray 1968: 85; see below) - presumably this was the same clay and used for the same purpose. Writing in 1772, Josiah Wedgwood mentioned a white ceramic body - part of his experiments in whitening creamware which eventually produced pearlware - which had apparently been successfully fired and contained "a small quantity of limestone which is intermix'd with all this Chert [the ground flint added to white stoneware and creamware bodies]" (quoted in I. Noël Hume 1969c: 390, cf p.391), indicating the deliberate adding of limestone to the clay. (G. Smith, in his C18 compendium of chemical and similar tests and recipes entitled *The Laboratory: or School of Arts:...*, claims (1750 ed: 98) that "*to prepare the Clay for fine Delft Ware*" one mixed "one part of calcin'd flint; one part of chalk, and one part of capital or the cream of clay": a combination in these proportions for such a body seems improbable, but the calcined flint would have given a harder body and the chalk would have supplied the lime.)

The deliberate addition of limestone to a clay body is in fact a very old technique: in the Iron Age II pottery of Stratum A at Tell Beit Mirsim (probably the Biblical Debir, Kiriath-sopher), ca.900-600 B.C. in southern Palestine it was a common additive as tempering, being a poor substitute for sand, flint, or quartz. Apparently it was used because proper tempering was unavailable: the potters of the time were aware of one of the drawbacks of using limestone, which is the drawback indicated above, that pottery using limestone tempering required very careful firing to a low temperature as calcium carbonate begins to decompose and generate gas somewhere above 600°C. If the clay is a true marl, however, the tiny lime particles would be so well diffused through the clay naturally that they would cause little trouble in a low-fired ware (Kelso and Thorley 1943: 94-5, 111-2). It is of course a characteristic quality of tin-glazed earthenwares that they are a soft-bodied ware, no doubt reflecting the necessary low firing.

Howe (1914: 140-1) lists several ceramic bodies using chalk - Sèvres porcelain used 4%, French siliceous faience used 24%, and a French tile body used 25%, while Vienna porcelain used 4% gypsum. (Whether it is coincidence or not that the use of chalk is confined to French pastes is not stated. Lesur (1957-60: 1328) also notes that chalk is an impurity in clay and that it causes bursts, but at the same time he indicates that in the south of France clays with up to 25% chalk are used, apparently because it is present in very fine granules only. He instances other areas where a similar presence of chalk occurs in clays used to make tiles.) Dienemann and Burre

(1928: 34) say that low calcium content is harmless; and Cardew (1969: 51-2 and chapt 8 *passim*) notes the usefulness of lime, chalk, and calcium carbonate in bodies and glazes, but he also notes (p.63) that bloating during firing can be caused by the body containing too much calcium carbonate or magnesium carbonate. A.R. Scott (1929: 51, 1-2) notes that lime has a bleaching effect on iron-bearing clays, hence its presence reduces the off-white or pinkish colours of fired ballclays containing iron; according to Kelso and Thorley, however (1943: 95), this is only the case with marl clays, where as noted above the lime comprises tiny particles well diffused through the clay naturally, and the artificial addition of lime would not produce this effect.

It is quite clear, therefore, that calcareous clays and limestone tempering are used without disastrous results, but there does seem to be confusion on the matter, for one source (H. Powell 1968: 19) says that lime is the principal flux in fusible clays - clays which vitrify at relatively low temperatures, lower than those at which vitrifiable clays vitrify - while another source (Dodd 1964: 166 s.v. Lime Refractory and Lime Blowing) says that while lime is indeed the best fluxing agent its instability because of hydration has largely prevented its use despite extensive research. (The above sections have been based primarily on A.R. Scott 1929; Rhodes 1957, 1973 ed; and Holdridge 1956; together with material from Searle and Grimshaw 1924, 1959 ed; *Enc. Brit.* 1960 ed: vol 5, 553-4; Rada 1960, 1964 ed; Drake 1966; and H. Powell 1968 in addition to specific references given in the text.)

Virtually no study has been made of the clays used in pipemaking; however, Duhamel du Monceau (1771: 7-12) records the results of analyses done on French, Belgian, and English clays by a M Rigault, *Physicien de la Marine* (Physicist with the Admiralty), and these are given below in tabular form:

	Andenne	*Hautrache*	*English*	*Desvres*
Natural colour	grey	brown	very white	brown
Reaction to acids	nil	nil	nil	nil
Weight of 1 cubic pied	150/4/6	143/4/3	135/11/0	144/3/6
Other data	15 po^3 powdered gives vol. of 33 *po*^{3}; absorbs 1 *liv* 3-1/2 *on* water; gives 44 *gr* sand	17 po^3 powdered gives vol. of 42 *po*^{3}; absorbs 15 *on* water; gives 81 *gr* sand	18-1/2 po^3 powdered gives vol. of 45 *po*^{3}; absorbs 1 *liv* 5 *on* water; gives 76 *gr* sand	16 po^3 powdered gives vol. of 41 *po*^{3}; absorbs 15 *on* water; gives 68 *gr* sand
	extremely pliant and ductile	rather less pliant than Andenne	much less pliant than Andenne and Hautrache	less pliant and compact than Andenne but more so than Hautrache

Mixes perfectly with water and remains in suspension for a long time because of fineness	precipitates faster than Andenne	precipitates slower than Andenne	
fires slightly red	fires a little whiter; some iron pyrites with consequent tendency to have ochre stain (and to wear moulds)	keeps white on firing	pinkish tinge from iron oxide (minimized by firing in reducing atmosphere)
small amount of shrinkage	has a little more shrinkage than Andenne	very large shrinkage	little shrinkage
few breakages while being worked as moulding solidifies it; very smooth surface which makes varnishing appear like vitrification		liable to break as takes less solidification in moulding; becomes very hard on firing; extremely rough surface despite whiteness and polish given	very easy to work

(Under 'weight of 1 cubic *pied*' the three sets of figures represent *livres*, *onces*, and *gros*; *po*^{3} signifies cubic *pouces*, *liv* is for *livres*, on for *onces*, and *gr* for *grains*. The source of the English clay was unknown, it having been obtained from an English ship captured during the Seven Years' War. Hautrage is spelt by Duhamel du Monceau Autrache, Desvres as Devres.)

As Andenne clay was esteemed the best for pipemaking (and the best from there was reserved for pipemakers, faience-makers having to take the next best) it appears that the most desirable characteristics were denseness, compactness, pliability, lack of shrinkage in firing, and freedom from impurities. Further, its ease of working meant faster production and better workers' pay. English clay proved to be distinctly poorer compared to the others; its only advantage is that it kept very white, but this was more than offset by poor finish and high shrinkage. This certainly agrees with this writer's observations on C18 English and Dutch pipes noted earlier in this chapter, and also with comparisons made between the Churchwardens made by Goedewaagen and Van der Want, the only two Dutch firms still manufacturing clay pipes, and those made by Pollock of Manchester, the only British firm still making clay pipes. The Dutch products have beautifully straight stems and an excellent finish, while Pollock's are definitely inferior in these aspects. (The reason why the negative reactions to acid are noted is because a certain authority of the time maintained that these clays were marls.)

In recent experiments Oak-Rhind has sectioned a number of C17 and C18 Dutch and English bowls, and notes that the former are very much softer than are the latter, only 2 minutes being required to cut a Dutch bowl as compared to 15 minutes for an English bowl. As there is no reason to suppose the Dutch fired their pipes at a significantly lower temperature than did the English - at present at any rate the Dutch fired to ca.25-60°C *higher* than temperatures recorded this century for the English industry (see Sections II and VII above) - this relative softness must be a property of the clay. Oak-Rhind also notes that the clay used by the Dutch absorbs tobacco tar far more than the clay used for post-1650 English pipes (Oswald *in litt.* 10 October 1973).

(Brongers (1964b: 37) notes that Andenne clay gave a milky white product - which agrees with the rather creamy colour generally observed on Dutch pipes - that German (presumably Westerwald) clay gave a chalk-white colour, and that English clay gave a snow-white colour, which last agrees with Rigault's observation. Brongers also observes that the German clay was more brittle than Andenne clay, but he is surely wrong when he says English clay "is well-nigh the best of all" and is still used in the Dutch pipemaking industry.)

Andenne clay was shipped to north France via The Netherlands - an appreciably greater distance than sending it by land - in order to avoid paying road tax. The clay cost 3 *livres* 10 *sols* per *quintal*. Clay from Hautrage cost approximately 2 *livres* a *quintal*, almost half the cost of Andenne clay. (Hautrage, like Andenne, is in modern Belgium, but much nearer the north French pipemaking centres than Andenne, and its clay may have been supplied by road - the Duhamel du Monceau text rather implies this.)

The best French clay according to Duhamel du Monceau (1771: 5) came from the Bray area NE of Rouen, but no details of its characteristics are given. Clay was mined in the Neufchâtel-en-Bray area, at Forges-les-Eaux ca.10 miles SE of Neufchâtel, at le Fossé immediately to the east (Duhamel du Monceau's le Fossay), at la Bellière ca.2 miles SE on the main road from Forges-les-Eaux to Gournay-en-Bray, and at Gournay-en-Bray itself, ca.12 miles SE of Forges-les-Eaux.

The English clay mentioned by Duhamel du Monceau undoubtedly came from southern or SW England - the lack of knowledge as to its source was possibly because it was apparently forbidden at this time to export English pipeclay (Duhamel du Monceau 1771: 10; cf Pettersen and Alsvik 1944: 37; see also below). By the later C19, as noted in Section VII above, South Devon was the area which supplied the pipemaking trade with clay, but there were many other sources of pipeclay from Barnstaple in North Devon (H.E. Smith 1860: 213; Jewitt 1878: I, 120; Strong 1891: 134; T.M. Hall 1890: 321-2; Charbonnier 1906: 258; Holland 1958: 25, 100) round the coast to Purbeck and above all Poole in Dorset, which appears to have been the major supplier of pipeclay until the earlier C19, to the Isle of Wight and to Thanet, as well as small and generally inferior deposits all over the country (Plot 1686: 121; Houghton 1693/4: 205; Atkinson 1968: 11, cf Candlin 1968, Salzman 1968, and Atkinson 1969a; Oswald 1960a: 42-3; Towner 1963: 12; Douch 1971: 145; Weatherill and Edwards 1972: 161-3) - though the deposit at Chitterne, Wiltshire, was used by the Gauntlett family of Amesbury for their famous pipes described by Aubrey as "the best in England" (quoted in E.T. Stevens 1876: 102-3).

The Isle of Wight deposits appear to have been of some importance at least in the second half of the C17 and the earlier C18. A shipment of "three tons of tobaccoe pipeclay and twoe barr. cont. fourteen gross of tobacco pipes" is recorded from Cowes to Brighton on 3 August 1666 (Atkinson 1968: 11 - date erroneously given as 1665); Newcastle upon Tyne was importing Cowes pipeclay in the year ending Christmas 1683 (Willan 1938: 116, 1967 ed); Cowes was sending pipeclay to Plymouth, Southampton, London, and Kingston upon Hull - as well as "potters' clay" to Fowey, Plymouth, Dartmouth, and Portsmouth and pipes to Plymouth - in the year ending Christmas 1687 (Willan op. cit. 153-4); and on 19 July 1716 a local grocer, Robert Collington, advertised in the Stamford Mercury advertised he had "a vessel lately come in with the Isle of Wight clay, and is willing to serve all the Pipe Makers round the country, and upon meeting with encouragment, will always keep a stock of clay ready for them", an advertisement which was followed 15 years later by another (Stamford Mercury 5 August 1731) suggesting Collington had indeed received some encouragement, for he was now an alderman and had set up his own pipemaking business with "the best of workmen from London" and was "the importer of his own clays from the Isle of White" (sic) (P.K. Wells files). (It is no doubt symptomatic of the disorganized nature of local trade that in the same year ending Christmas 1687 that Cowes was exporting pipeclay widely - see above - it was also recorded importing pipeclay from Poole (Willan op. cit. 154), and in the year ending Christmas 1691 was importing pipes from Poole (ibid. 156): this last was probably not an isolated incident, for Willan alsc notes (p.158) that towards the end of the C17 pipes from Lyme Regis were being sent to Cowes.)

Pipeclay was being shipped to London from places on the south coast by 1611 (Oswald and James 1955a: 187), but in 1618 Philip Foote, who obtained a 21-year monopoly to supply clay to all pipemakers in England and Wales in that year (see 3: I), obtained his clay solely from one John Overy, yeoman, of Hartley, Kent. He apparently obtained it in large amounts (R.H. Cooper in litt. 8 October 1969). There are two Hartleys in Kent, one 8 miles west of Rochester and the other 13 miles SW of Tonbridge.

Further to the west, in Surrey, deposits of white-firing clay, including occasional deposits of "pipe-clay" occur (Holling 1970: 19 and 21). White-firing wares are not known to have been produced in Kent or Sussex, where pottery of this type is ascribed to a Surrey origin (Mynard 1970: 40; cf anonymous short book notice in PMA 4 (1970) 207), but as

Moorhouse notes (1971: 43) it can be suspected that the wide geographical range of "Surrey White Ware" came from various kilns where white-firing clays outcrop. Such wares, on archaeological evidence, were being produced in the C17 (Holling 1970; cf Matthews and Green 1970: 10) - they occur in a second-quarter-of-the-C17 context at Dover Castle (Mynard 1970: 31-46) - and the documentation of the Hartley deposit raises the possibility of the Kentish production of white-firing wares at this time.

The earliest reference to a pipemaker by name known to this writer is to a Peter Takell working in Barnstaple in 1599 (quoted in E. Watkins 1966: 217 from an exhibit label in Barnstaple Atheneum; the label was seen by this writer in 1969), and as Barnstaple had its own local ballclay it is certain that Takell was using this. (How effective Foote's monopoly of 1618 to supply clay to all pipemakers in England and Wales was in practice is uncertain - the following year Swithin Bonham of Poole, like Foote a founder-member in 1619 of the Westminster pipemakers' guild, was granted a seven-year lease by an absentee-landowner to exploit pipeclay at Poole; and in 1626 what appears to be a re-lease of this land by the same landowner to a William Cooper of Poole, is noted, this time for 21 years (see p.373 below). Further, as noted in 4: IV, two Scots were given a monopoly to export clay to England in 1619, and clay suitable for tobacco-pipes is mentioned.)

By the 1630s Poole appears to have been pre-eminent in the pipeclay trade, and it continued to monopolize this trade until at least the early C19, shipping as far as Glasgow, Liverpool, and Kingston upon Hull (Willan 1938: *passim*, 1967 ed; E.F.J. Mathews 1958: 33-5). As this material is certainly ballclay it is likely that all pipeclay was ballclay. Before the middle of the C19, however, the Devon ballclay deposits appear in pipemaking accounts and by the second half of the century they become the standard sources for pipemaking clay. Why this change appears to occur is not clear, for Poole continued to be a major centre for this shipment of ballclay at least until the end of the C19 - in 1840 nearly a third of the pottery made in England depended on Poole clay and the trade reached its peak in 1884 when 60,000 tons were shipped. However, A.H. Dunhill (1954: 91, 1961 ed) claims Devon clay was used for pipemaking at Broseley because it was superior to that from Dorset. By 1952 the annual production figure for Poole clay had dropped to 6,000 tons (noted in K. Hudson 1965: 132, 1968 ed).

There is a fairly recent study of the Devon ballclay trade by Bulley (1955), but certain of his observations appear open to question. According to him (p.191, also in A.R. Scott 1929: 33), the Devon ballclay trade was established in North Devon in the late C17 and extended to South Devon and to the Poole area of Dorset in the years after 1700. This last is certainly wrong, for as shown above, Poole clay was being exploited for pipemaking at least by 1619. Though Bulley notes that ballclay was known as pipe- or tobacco pipe clay he made no mention of its use in pipemaking but refers only to its use in pottery, which he says starts only ca.1700. He notes that first recorded export of North Devon clay from Bideford was a small amount in 1691, most of it going to Bristol but some also going to Liverpool, Chester, Padstow, Gloucester, Bridgwater, and Swansea; by ca.1740, he says, the South Devon trade had overtaken it in importance

(1955: 191-2, 194-5; cf A.R. Scott 1929: 7, where he notes working of South Devon clays is said to have started ca.1740, though it might have been used before that for pipemaking at Knighton nr Plymouth). Regardless of the state of the South Devon ballclay trade, however, the North Devon trade in the mid-C18 still appears to have been important at any rate to Bristol users: in 1720 Bristol took 20 shipments of North Devon clay (Bulley 1955: 197); in the year ending Midsummer 1735 Bristol was receiving tobacco pipe clay from Bideford (Willan 1938: 174, 1967 ed); between Christmas 1736 and Christmas 1737 Bideford shipped coastwise over 900 tons of tobacco pipe clay "chiefly to Bristol, but also to Padstow, Bridgwater, Neath, Chester and Liverpool" (Willan op. cit. 168); and in 1755 it was recorded that "near Ware Giffard [the same deposits as recorded by A.R. Scott] there is plenty of fine pipe-makers clay, many ship loads of which are annually exported to Bristol, Liverpool, Chester and other places" (quoted in Keen 1969: 147). As late as 1797 it was noted that "fine pipe-maker's clay is found at Wear Gifford in abundance" (quoted in T.M. Hall 1890: 321).

According to Bulley (1955: 191-2), ballclay was first used for slips on Staffordshire and London wares, and then in the 1730s mixed with calcined flint to produce early creamware, the production of which brought prosperity to the South Devon clay industry. However, C.M. Watkins, dealing with C17 North Devon sgraffito and coarse earthenware exports to North America, notes (1960: 27) large quantities of pipeclay being shipped from Bideford to Ireland, Bristol, and Exeter in 1681, ten years before Bulley's first reference. Further, the sgraffito wares, datable to the period 1660-1690s on North American sites, have what Watkins calls a "kaolin" slip: kaolin has been a common misnomer for ballclay in North America for many years (Howe 1914: 3) and is constantly so used to describe white clay pipes in North American archaeological literature (cf I. Walker 1970b: 160; 1971a: 26; 1971d: 19) - Bivins, in his excellent work on the Moravian pottery of North Carolina, talks of a white clay used for slips and also sometimes for the pottery stub-stemmed pipes produced in the area (see Section VIII above) as "Kaolin, or pipe-clay" (Bivins 1972: 76-7). The ballclay deposits immediately adjacent to Bideford were certainly used to produce the white slip (Charbonnier 1906: passim), so these deposits were being used well before 1700. Indeed, elsewhere Watkins does talk of North Devon "pipe-clay" being used for the white slip on early English white saltglaze stoneware (C.M. Watkins 1968: 133-4; cf below). (Slip and applied decoration of pipeclay are known on German and other British pottery of the C17 and C18 (I. Noël Hume 1970c: 102-3, 118-9, 123, 135, 139; cf Oswald 1970b: 238) - unfortunately Noël Hume's reference (p.104) to North Devon sgraffitto slipware notes only a "white" slip.)

Bulley notes that South Devon clays went chiefly to London; Bristol was the chief buyer of North Devon clay. This seems inherently likely, but as the earliest Bristol pipemakers were in business as early as the first quarter of the C17 one may suspect that the North Devon clay trade with Bristol started from that date rather than the late C17 as Bulley suggests. Further, ballclay was a constituent of tin-glazed earthenware, and the Bristol tin-glaze industry had started before 1650, again suggesting an earlier clay trade than do Bulley's dates. Confirmation of this, however, must await study of the Bristol port-books, but certainly North Devon ballclay was being used in Bristol for stoneware as late as WW II (Holland 1958: 102).

Early references to "pipeclay" in the pipemaking industry unfortunately do not make it clear whether they mean ballclay or kaolin, and the term itself, of course, begs the question. Cardew (1969: 322) defines pipeclay as "(1) originally, ductible white clay suitable for making clay tobacco-pipes (2) now usually a clay suitable for making salt-glazed sewer-pipes". However, despite the assertion in Houghton (1693/4: 206) that the clay used to make "chinaware" was the same as that used to make pipes it is certain that ballclay was the material used. This is proved not only by Bulley's study of the Devon clay industry (Bulley 1955), where he notes that ballclay was called "pipe clay" or "tobacco pipe clay" in shipping records but by A.R. Scott's study of ballclays, where he clearly shows pipeclays to be certain beds of ballclay (A.R. Scott 1929: 6, 26, 32, 37-8, 45-7). (Honey is certainly wrong when he differentiates North and South Devon clays by referring (1952: 180 s.v. Devon) to the former as pipeclay and the latter as ballclay as though the two were different types of clay.)

By "chinaware" Houghton did not mean true, hard-paste, porcelain for this was not successfully manufactured in Europe until ca.1710; and it was not until 1768, after 23 years of experiment, that William Cooksworthy perfected at Plymouth the use of kaolin in the making of true porcelain in England (Honey 1928: 31-2, 1946 ed) and the properties of Cornish kaolin became recognized (for a description of Cookworthy's investigations see D.B. Barton 1966: 15-21; also Raistrick 1950: 204, 205-7, 1968 ed). It is extremely unlikely that Houghton meant soft-paste porcelain, for even this was not made in England before ca.1743, though it was being made in France to some extent in the second half of the C17 (Savage 1954: 193, 162, 1961 ed) and may have been the "porcelaine commune" referred to by Savary des Bruslons as being made of pipeclay in the entry on pipes in his *Dictionnaire universel*... (Savary des Bruslons 1759-65 ed: IV, col. 200), an entry probably basically early C18 in date (see p. 54 n. 16). The most obvious explanation would be that Houghton meant tin-glazed earthenware, an imitation of porcelain sometimes called Holland China (cf I. Noël Hume 1970c: 106), but Houghton notes his source as being "the ingenious Mr. Daught of Fulham": this was John Dwight (cf Jewitt 1878: I, 124) who died in 1703 and who took out a patent in 1672 for the manufacture of "Cologne ware" stoneware and "transparent earthenware commonly called porcellane or china" and whose Fulham pottery, founded in 1672 or 1673, remained in the family for over 190 years and still exists, though its business is now that of selling potters' material and equipment and the site is in the process of being redeveloped (Christophers and Haselgrove 1971; 1973; Christophers, Haselgrove, and Pearcey 1974). The "Cologne ware" stoneware was an imitation of Rhenish Bellarmines - Dwight also imitated Westerwald styles - and the "transparent earthenware...porcellane or china" was a high-quality slightly-translucent stoneware, an attempt to copy Chinese porcelain in which the firing technique was mastered but the crucial china-stone, or petunse, was lacking (Jewitt 1878: I, 118-26; Mankowitz and Haggar 1957: 93, 79; Bimson 1961; I. Noël Hume 1969c: 14; 1970c: 111-2, 114; Weatherill and Edwards 1972: 175 n.34 for the 1672 patent date and the 1672 or 1673 date for the founding of the pottery).

Fine white clay from Devon, which must have been ballclay, was apparently being used at Burslem in Staffordshire as early as 1710-15 as a slip to cover drab bodies made of local clays, the vessels then being salt glazed (I. Noël Hume 1963: 295, cf C.M. Watkins 1968: 133-4 and Weatherill 1971: 13-17). Simon Shaw, whose work "originated in the Reminiscences of many aged Persons" (1829: v, 1970 ed), indeed talks of John Astbury (B 1688, D 1743) using "Pipe Clay, from Biddeford, mixed with water" for the slip, and credits Astbury with being the first to use this method of producing a white stoneware apparently ca.1710 (1829: 126, 127, 1970 ed). This was a prototype of the English white saltglaze wares of the C18 which were certainly in production by 1720 (I. Noël Hume 1970c: 114; cf 1969c: 14 and 1970a: 249, 248 fig 1 for its occurence in an archaeological context with a terminal date of 1729)[34], for as the fine white clay became cheaper and more readily available it became possible to make vessels entirely from it (I. Noël Hume 1963: 295; Weatherill 1971: chapt 2). (As early as ca.1865, according to Shaw (1829: 109-10, 1970 ed), a local whitish clay from Shelton was being used together with fine sand from Baddeley Hedge to produce a primitive white stoneware; ca.1710 another, and whiter, proto-stoneware was being produced "by mixing common pipe clay with the fine grit or sand from Mole Cob" (S. Shaw op. cit. 127-8).)

The invention of true white-bodied stoneware by using Devon pipeclay in the years following his discovery of its usefulness as a slip and then ca.1720 his discovery of using calcined flint as an additive is also attributed to Astbury by Shaw, who had talked to Astbury's grand-daughter and great-grandson who had died in 1816 and 1823 respectively (S. Shaw ibid. 126, 128-30). However, contemporary evidence in support of this attribution is lacking (Mankowitz and Haggar 1957: 10; cf Mallet 1967: 203), and Shaw's story of how Astbury accidentally discovered the usefulness of flint - while travelling to London in 1720 he was forced to seek attention for his horse which was apparently going rapidly blind and an ostler at Dunstable blew pulverized flint into the horse's eyes and Astbury noticed the white colour of the powder and its clayey appearance when mixed with the moisture in the horse's eyes - sounds apocryphal: in fact, there is evidence that flint was being used in Staffordshire in the 1710s, and Dwight of Fulham was aware of the properties of flint in ceramics by the end of the C17 though he probably did not use it. In 1719 John Felton of Newcastle-under-Lyme and Thomas Hill of Sheldon formed a partnership to produce "flintware", and when the partnership was dissolved two years later it was noted in the settlement that there was clay, which had been brought through both Bridgnorth and Liverpool, and panned flint, with stampers and mortars for preparing the flint listed among the tools. The 1721 inventory of the goods of the deceased potter Samuel Edge of Burslem, who had been a stoneware potter in the period 1710-15, also noted three expensive mortars and pestles which were probably for preparing flint (Rowlands 1968: 51; Weatherill 1970: 5; 1971: 17, 23). All this would indicate that the use of flint to produce true stoneware was known in Staffordshire before the 1720 Astbury date, but it is significant that the Astbury story is set at Dunstable, in the Chilterns, where flint would have been common, and not in

Staffordshire, where flint does not occur. Certainly Josiah Wedgwood, though admittedly writing much later, in 1777, indicated white saltglazed stoneware had evolved from earlier saltglazed stonewares of local Staffordshire clay by the use of "White Pipe Clay [mixed] with...Flint Stones calcin'd & reduc'd by pounding into a fine powder" (quoted in I. Noël Hume 1970a: 250). Shaw too says (1829: 90, 1970 ed) that "In Staffordshire the English stone ware is manufactured of white pipe clay", and the reference above to the clay used for Fenton and Hill's "flintware" by 1721 coming via both Bridgnorth and Liverpool is particularly interesting, for it indicates clays from the South-West were being brought up the Severn (to Bridgnorth) by this date and thus could have been obtained this early by Broseley pipemakers (see below).

Again according to Shaw, who was a chemist, the difference between native Staffordshire clays and that from Bideford - later known as Chester clay because it was shipped to Chester for The Potteries - was that local clays all contained iron oxide, whereas those "from Dorset and Devon, used by the tobacco-pipe makers, have all their impurities extracted before they are vended to the purchasers", the lack of iron oxide making them "extremely white when fired" (S. Shaw 1829: 125, 1970 ed). This of course is correct, though the apparent implication that Bideford clay-merchants purified their clay in some manner prior to selling it is wrong, the clay being, as noted above, naturally free from iron impurities.

According to Fleming (1923: 83) clays for the tin-glazed earthenware produced at the Delftsfield pottery in Glasgow when it started production in 1748 came from Carrickfergus, Co. Antrim, Northern Ireland, which source was already supplying the Liverpool tin-glaze industry which had started at the beginning of the C18 (Garner 1961: 67-8, 68-9, 73). Carrickfergus clay was also used by 1747 to make tin-glazed earthenware at Dublin, and by 1767 was probably also used by tin-glaze makers in Bristol (Garner 1961: 68, 73; Raley 1963: 107; Charleston 1963: 226 and refs). In 1766 Delftsfield started producing white salt-glazed stoneware on a limited scale, but in 1770 creamware production started and this was to progressively take over from tin-glazed earthenware (Fleming 1923: 86, but cf shipping list on p.92 of items to North American colonies in 1771 including tin-glaze and stoneware but no creamware and similar lists on p.92 of 1791 and 1796 listing tin-glaze and creamware but no stoneware). During four months of 1768, 50 tons of Carrickfergus clay was shipped to Liverpool for tin-glaze production (Garner 1961: 73), and in 1771, when on the above evidence creamware and tin-glaze would have been the major products, Delftsfield imported 26 tons of "potter's clay" from Carrickfergus.

This clay is almost certainly ballclay: in 1811 the Carrickfergus clay deposits are described as

> ochre, brick-clay, potters clay, or light blue clay, greyish clay, and deep blue clay. The latter [sic] is found beneath the sub-marine peat bog, strata of brick clay and light blue clay are also found within the sea marl" (quoted from S. M'Skimin The History and Antiquities of the County of the Town of Carrickfergus (1811) by the Geological Survey of Northern Ireland, in litt. 10 September 1970).

Little of this clay now remains according to the Geological Survey, erosion last century having removed most of the deposits, and according to M'Skimin by his time (1811) the clays had "long ceased to be an article of export" - formerly, he noted, much had gone to England, and to a pottery at Rostrevor, Co. Down.

If the "pipe-clay" is the same as the "light blue clay", this could be similar to the blue Devon and Dorset ballclays, and if it indeed comes from within the "sea marl" then it might well have been calcareous and very suitable for tin-glaze earthenware, as already noted. (A Swedish account of 1767 describing Bristol tin-glaze production said the clay used came partly from near Bristol and partly from Ireland, the local clay being much too fat and needing to be mixed with the lean Irish clay before working. The Irish clay probably came from Carrickfergus (Charleston 1963: 226 citing A. Baeckström's *Rörstrand och dess tillverkningar 1726-1926* (1930) and M.S.D. Westropp's *Irish Pottery and Porcelain* (1935) 30-1); the Bristol pottery referred to is probably the Redcliff Pottery of Richard Frank (Ray 1968: 52 and n.22). The clay from the Bristol area came from "Dondery" and "Stacent" - the former is Dundry, now on the southern boundary of the city, the latter is unidentified. Dundry clay appears to have been used at one time by Dutch delfware potters (Hughes 1961a: 18, cf Ray 1968: 85; see below).

A "good vein of fine clay that will retain its whiteness after it is burnt (when others turn red) and therefore used for the making of tobacco-pipes" was being used near Leeds from shortly before 1714 (quoted in Towner 1963: 12 and n.1); and the Leeds Pottery, which was working in this area from before 1770 and producing white saltglaze stoneware and later creamware and pearlware, was using Poole clay - which certainly is ballclay - as well as the local white clay in 1796. At the same date the pottery was importing flint from Sussex and as calcined flint was used (as already noted) in the production of all three wares noted it seems clear - despite the assertion of the unreliable Fleming (1923: 86-7) that kaolin was essential to the production of creamware and that initially it was imported from the Carolinas and Virginia until Cooksworthy's discovery of Cornish kaolin and its use from 1768 - that ballclays were the basic constituent of English white stoneware, creamware, and pearlware (by 1796 the first-named was probably no longer being produced, and pearlware would be taking over in popularity from creamware) (Towner 1963: 15 and *passim*). Initially, the Cambrian Pottery at Swansea used North Devon clay for its creamware - this would probably have been in the 1760s and 1770s - though subsequently the firm used South Devon and Dorset clay (Nance 1942: 39, 23 n.1, 413; all these must be ballclays, though Nance seems to use ballclay and pipeclay to mean two different things, cf Honey above). At Pardoe's Nantgarw pipe and pottery works near Cardiff, which was in business 1833-1920, south Devon clay was used both for the pipes - the factory's major product - and the white-bodied earthenwares also produced (I.J. Williams 1932: 143), a clear indication that refined C19 wares, the descendents technologically of the C18 white stonewares, creamwares, and pearlwares, were being made of pipeclay.

Pocock, visiting Bristol in November 1750, went to see a recently-established factory known as "Lowdin's china-house" where

> They have two sorts of ware, one called stone china, which has a yellow cast, both in the ware and the glazing, that I

> suppose is made of pipe clay and calcined flint. The other they call old china; this is whiter, and I suppose this is made of calcined flint and the soapy rock [see below] at Lizard Point which 'tis known they use (quoted in Pountney 1920: 186-7; also incompletely in Latimer 1893: 286).

The "stone china" appears not to be stoneware, as might be supposed from the name, but the lead-glazed yellow and brown slipware imitating Staffordshire products (Pountney 1920: 189) which have more recently been discussed by K.J. Barton (1962: 164-8); but in any event the body belongs to the refined earthenware family including English white stoneware, creamwares, and pearlwares. The "old china" is a soft-paste porcelain, not the true porcelain, but the reference is interesting in indicating the use at this stage of soapstone as a key ingredient in the search for a pure porcelain body.

Among the French terms for creamware was terre de pipe and among the German Pippgut (Honey 1952: 148; Ernould-Gandouet 1969: 30-1) clearly implying the use of pipeclay in creamware manufacture - Honey also notes that ca.1748 or 1749 white terre de pipe was used to produce figures at Lunnéville and other Lorraine centres and that this did not have the calcined flint added to produce the harder wares and true creamwares (1952: 149 and entries cited; cf Brongniart 1854 ed: III, 12 s.v. Lunnéville and 14 s.v. Strasburg).

(The same Swedish reference referred to above also notes that Worcester porcelain was made of a clay brought from "Tingmouth", presumably Teignmouth near Newton Abbot. This might seem to suggest that Worcester was using ballclay, for the clay deposits in the Teignmouth-Newton Abbot area are certainly ballclay, but the reference goes on to say that the clay, and also the hill when it was dug, was called "Sopiwek" which suggests Cornish soapstone (steatite) was being referred to. This formed a vitreous body similar to that formed from Chinese kaolin and petunse but at a much lower temperature, and was used in porcelain-manufacture in Britain by 1750 and until ca.1800 when the bone-china body replaced it. Pocock, visiting Cornwall in October 1750, noted that he went to see the "Soapy Rock" near the Lizard. "There are white patches in it, which is mostly valued for making porcelaine,...now carrying on at Bristol", (quoted in Nance 1942: 473, cf Latimer 1893: 286). There are in fact extensive deposits of soapstone in Cornwall (Savage 1954: 196, 1961 ed); "Soapy Rock" and "Sopiwek" must be the deposits at Mullion and elsewhere on the Lizard exploited from 1748 (Nance 1935; 1942: 472-6; Douch 1970: 36). As the Lizard is in Cornwall and Teignmouth is in Devon either the Swedish visitor telescoped his travels in his diary or the soapstone was being shipped in Teignmouth vessels.)

The difference between ballclay and kaolin appears to have been something of a mystery to potters of this time, even to Wedgwood. According to Fleming (1923: 272-3), who in this instance is quoting Wedgwood's Commonplace Book and thus may be correct, in 1779-80 Wedgwood himself wrote that kaolin was supposed to contain little phlogiston - the hypothetical principle of fire regarded as a material substance at one time - and that James Watt (the inventor of the steam engine and formerly a potter) recommended that to find whether a clay was ballclay or kaolin a soft lump of the material should be put in a coal fire and given a blast with a bellows. If it was pipeclay (i.e. ballclay) it would turn black or bluish - become "highly phlogisticated" - while kaolin would come out of the fire perfectly white. In 1697/8 when attempts were being made to set up a pipemaking and pottery industry at Whitehaven in Cumberland and the question arose "If there by any particular Way of Tryal to distinguish what Clay is fit for what sort of Work", John Dwight of Fulham, who was consulted, indicated that "No certain knowledge of Cleys can be had without examining them in the fire" (quoted in Weatherill and Edwards 1972: 162, 164), presumably referring to the same sort of test. From this evidence one can guess that unsophisticated pipemakers in the C17 and C18 probably chose their clay on an entirely practical basis. (Parsons (1964: 247) asserts there was a partial use of kaolin in place of ballclay in the late C17 and early C18, but he cites no source for this contention and his evidence does not justify his conclusion.)

An interesting example of the difficulties of identifying the correct clay for pipemaking is noted by the C17 antiquarian Dr Plot in his 1677 *History of Oxfordshire* where he observes (quoted in Jewitt 1878: I, 121) that John Dwight made his imitations of Rhenish Ballarmine stoneware jugs "of a clay in appearance like to tobacco-pipe clay, which will not make tobacco-pipes, although the tobacco-pipe clay will make [Bellarmine] bottles" (cf 1673 reference to him using a "transparent white stone and a little fine white sand" quoted in Bimson 1959: 11). However Dwight, answering other queries posed in 1697/8 by those wishing to set up pipemaking and potting at Whitehaven (above), claimed

> The differences between stone and Earthen Ware are such as these stone Pots (not Holland but cologne Ware) are made of Tobacco Pipe Cley wth some fine sand intermixd, & are burnt very hard wth Wood fire, & burnt but once. the Earthen Gally or White Ware cannot be made of Tobacco pipe Cley, but of other sorts that will not endure a stronge fire, & are twice (but soft) burnt, & that with wood only, for the glazing of wich White, Tin & Lead calcind together are used (quoted in Weatherill and Edwards 1972: 164)

Here he says he *does* make Bellarmines (the "cologne Ware") from pipeclay, whereas Plot implied he did not, though pipeclay could be used. He is also saying tin-glazed earthenware (the "Holland Ware" and "Gally or White Ware") cannot be made from pipeclay; but in fact pipeclay, or ballclay, forms half the material used to make the tin-glaze body: Dwight himself continues that a red clay "which is very strong", a blue clay "w^{ch} is of good strength" and a white clay "which is y^{e} weakest" are mixed in a proportion of about three barrels of the first to five of the second to seven or eight of the last (Weatherill and Edwards *loc. cit.* and Edwards 1974: 19). The red clay was ordinary potting clay, the blue was presumably the East Anglian marl with high lime content noted above, and the white was Poole clay which was certainly a ballclay used by pipemakers (Weatherill and Edwards 1972: 173 and Edwards *loc. cit.*).

There appears to have been a deposit of light- or white-firing clay in the Coventry area used for slips and pottery from the C13 to ca.1700 though the source of the clay is unknown (Woodfield 1966: 78-9). What source or sources of pipeclay were used by Midlands pipemakers is uncertain, but in view of the major importation of Devon and Dorset ballclays by the Staffordshire pottery industry from the early C18 most pipemakers from that date presumably used this.

Whether the Broseley industry in Shropshire initially used local clay has been disputed. R. Thursfield (1863: 79) claimed that "the clay of which [Broseley] pipes are made is, and so far as tradition can testify, has always been" from Devon and Cornwall (possibly Dorset is meant by the latter, as Cornwall has no ballclay - Cornish pipemakers initially used local clays, such as those at St Agnes on the north coast and probably those from St Erth and Ludgyan between Hayle and Penzance in the far west; but by 1758 Poole clay had superceded local clays according to William Borlase, and Port Book entries for the later C17 and as early as 1668 note pipeclay being imported through Fowey, Truro, Falmouth, an Penryn (Douch 1971: 145; cf Willan 1938: 164-5, 1967 ed)). Local clay from Shirlett, Thursfield continued, made very inferior pipes and those pipes which he had seen of that clay were not, he felt, of any great age. T.H. Thursfield, however, averred (1907: 163-4) that "There is at Shirlett a white clay similar to that used in early days at Broseley" whose colour and texture "is easily distinguishable from the Devon or Cornwall [sic] clay from which Broseley Pipes have for some years been made". This last part rather implies the use of Devon clays at Broseley was relatively recent. Randall (1908: 440-1), who was of a family long associated with the local ceramic industry (Oswald and James 1955a: 187), talked of Devon and Dorset clays being used, and noted that neither local history nor tradition indicated local clay had ever been used in the Broseley pipe-industry, though he suggested it might have been for the earliest manufacture; however, his account appears to be an attempt to reconcile the two Thursfields' accounts rather than an indication of any new evidence. However, there was a local coarse white-firing clay at Broseley (Randall 1877: vi). A.H. Dunhill (1954: 91, 1961 ed) noted that latterly at Broseley Devon clay was used, it being superior to either Staffordshire clays or, interestingly, those from Dorset. Oswald and James (loc. cit.) feel it is likely local clay would have been used initially.

As noted above, Devon clay was not being brought to the Staffordshire pottery industry before the early C18, so it is unlikely the more modest trade of pipemaking would have imported it before that time. Oswald and James also observe that Newcastle-under-Lyme pipes are of a very similar texture to Broseley pipes, and as they note, Plot (1686: 121) recorded that Charles Riggs of Newcastle made "very good pipes of three sorts of Clay", two of which - a white clay and a blue clay which fired whiter than the white clay but shrank more - were found between Shelton and Hanley Green and the third - a whitish-yellow clay which was brittle but fired without undue shrinkage - from Grubbers Ash. Shaw (1829: 97, 1970 ed) also noted that "a fine sort [of clay] is found in Hanley, and Shelton, which for a long while served the various purposes of the Newcastle tobacco-pipe makers". Atkinson (in litt. 24 April and 20 May 1972) notes Broseley-made pipes can be distinguished from Broseley-style pipes by, among other factors, the clay used, and that until ca.1730 a clay from the nearby Severn Gorge was used by Broseley pipemakers; the appearance of his paper on the Broseley industry, at present delayed by the publishers, is eagerly awaited.

As noted in Section I above, pipemakers in north France and what is now southern Belgium mixed clays from various sources for various qualities of pipes: such mixing does not appear to have been the practice in the British pipemaking industry, but Plot (loc. cit.) notes that Charles Riggs of Newcastle-under-Lyme, apart from making "very good" pipes with the three types of local clay noted above, sometimes mixed the blue and whitish-yellow clays, the reason no doubt being that the characteristics noted of these two clays complimented each other; and a 1671 inventory of a deceased Spalding pipemaker, John Fox, included 20 tons of black and white clay (P.K. Wells 1972: 14), suggesting he used different clays. Plot also notes (1686: 122) other, apparently different, white or light-firing clays: one called "White-clay" was bluish and used for yellow-coloured wares, yellow being the lightest colour achieved, and apparently from this a white slip was also made. "Bottle-clay" was a bright whitish colour with dark yellow inclusions and was used when mixed with "red blending clay" to make pottery known as black wares. Plot's Oxfordshire and Staffordshire observations suggest pipeclay was not simply any white-firing clay, but there can be no doubt that the vast bulk of clay used by English pipemakers from earliest times has been, and still is, ballclay.

According to Fleming (1923: 41) the first china clay (that is, kaolin) used in English and Scottish potteries was from Virginia, and Wedgwood imported some of this clay until the Cornish deposits were discovered as noted above (cf Griffiths and Wedgwood 1970: 64-7). At present, British kaolin deposits are still economically important, and are associated with the granitic intrusions of the late Carboniferous in parts of Cornwall and Devon (FIG 120). The main outcrops are in the Land's End, Carnmenellis, St Austell, Bodmin Moor, and Dartmoor areas, although production is now centred in the kaolinized parts of the St Austell Granite.

British ballclays, as noted earlier, are obtained from three comparatively small areas, also in SW England - Petrockstow in North Devon, ca.15 miles south of Barnstaple; between Newton Abbot and Bovey Tracey in South Devon; and the Wareham-Poole area of Dorset. The South Devon clays, together with associated beds of sand and lignite, are in places nearly 1,000 ft thick (Adams 1961: 5-7).

From the foregoing, it can be seen that the term "ballclays" comprehends a wide variety of clays. A.R. Scott, in his detailed study of English ballclays, indicates the varying nature of different deposits and beds and the variety of purposes for which they are used, from the production of stoneware to blocks of whitening for doorsteps (A. Scott 1929: 22 and passim). Among these uses, as already noted, is the production of tobacco pipes, and analyses are available for two South Devon deposits of pipe or cutty clay (A.R. Scott 1929: 45-7, samples SA, SB, and SM). These are quoted below, together with the figures given earlier for a South Devon blue clay and a Wareham, Dorset, ball clay:

	sample SA	sample SB	sample SM	South Devon blue	Wareham
SiO_2	59.61	50.76	55.85	45.60	50.76
Al_2O_3	26.11	29.43	29.83	35.48	33.52
titanium and iron	2.42	2.82	2.42	1.96	2.25

Samples SA and SB are from the same bed, which gives an idea of the variation in composition even within the one deposit.

From these figures it appears that although there is a wide variation within what is called pipeclay, these clays are consistently higher in silica and lower in alumina than the general run of South Devon ballclays; and that clays from Poole, which as noted in an earlier section appears to have been the source for most pipe-making clays (cf numerous references to pipeclay there, A.R. Scott 1929: 37-8) from the beginning of the C17 until the early C19, are more similar to the South Devon pipe clays. As also noted, in an earlier section, the Glasgow pipemaking firm of McDougall's made blocks of whitening out of their poorer-quality clay. Analysis of a "household" clay - the type used for making these blocks (A.R. Scott 1929: 46-7 example SN, 32) - indicates over 72% of silica and 18% alumina, which suggests that "poorer-quality" clay to a pipemaker would be clay with a marked concentration of silica and a lack of alumina: this in turn suggests that though pipeclays seem to have more silica and less alumina than the average ballclay there are definite upper and lower limits to the amounts of these minerals. As already noted, Adams (1961: 5) says that stoneware clays are the darker-burning and more siliceous ballclays, and figures for a Staffordshire stoneware clay are given by H. Powell (1968: 26-7) as follows:

SiO_2	59.00
Al_2O_3	25.00
titanium and iron	3.05

These figures are almost identical to sample SA of South Devon pipe or cutty clay noted above and might imply that pipe and stoneware clays are virtually the same (cf below); but Scott gives two vastly different analyses for two clays both called stoneware clays (samples SR and DR, pp46-7 and 48-9 respectively), one from South Devon and the other from North Devon, which suggests the composition of clays suitable for stonewares can be extremely variable. Scott's figures are:

	sample SR (South Devon)	sample DR (North Devon)
SiO_2	77.56	49.17
Al_2O_3	13.85	33.37
titanium and iron	2.27	2.73

Attempts to confirm that the Andenne clay used for pipemaking was indeed a ballclay ran into a surprising amount of difficulty. Brongniart (1854 ed: III, 5-29) has analyses for a large number of clays throughout the world, and gives the following compositions for Andenne and "Devonshire" clay, both of which he describes as being used in the production of faïence fine (refined earthenwares of the English salt-glazed stoneware, creamware, pearlware, and general C19 fine earthenware family):

	Devon	Andenne
SiO_2	46.35	52.00
Al_2O_3	37.00	27.00
iron	0.00	2.00

As indicated above, figures for Devon ballclay vary considerably not only from deposit to deposit but within the same deposit, so presumably the figures represent a typical potting ballclay (presumably from South Devon). Presumably also, the Andenne figures represent an equally-typical clay there - the Musée Communal de la Céramique at Andenne in an exhibit on the local clay industry which describes the clay as being a silicate double d'alumine, indicates from 13% to 40% alumina; Borremans and Lassance (1956b: 7 and n.8) note up to 50% silicate content. Brongniart's Andenne figures fall within the range of Scott's South Devon pipeclay samples SA, SB, and SM (see above), being quite similar to sample SB. From this there would seem to be little doubt but that Andenne clays are ballclays. The 2% iron would agree with Duhamel du Monceau's observation that Andenne clay fired slightly red. The Curator of the Musée de la Vie Wallonne, Liège (information via the Institut Belge d'Information et de Documentation in Brussels, in litt. 22 April 1968), referred to Andenne clays as a "very pure plastic clay...pure alumina silicate free from other mineral salts": the pliancy indicated by him, and also noted by Duhamel du Monceau, is characteristic of ballclay, though the small shrinkage noted by Duhamel du Monceau is unusual because normally the more plastic the clay the more shrinkage there is. Javaux's reference (1935: 4 n.3) to the use of Andenne clay in Gouda and Delft delftware factories would normally indicate the clay to be a ballclay, though tin-glazed earthenwares can apparently be made with kaolin, as was done at Cologne between 1788 and 1792 (Honey 1952: 140 s.v. Cologne - faience, cf 540 s.v. Saint-Yrieix). The firm of Jean Delbar-Bex, a Belgian supplier of clays, however, states (in litt. 27 May 1968) that the clay of the Andenne area does not burn white "and must be put in the class of the fireclay"(!) - they know of no mines of ballclay but note three of kaolin elsewhere in Namur province. (As noted above, Duhamel du Monceau says Andenne clay fires slightly red, but this does not make it a fireclay.)

In fact, clay from a number of sources appear to have been used to produce Dutch delftware. One authority (Ray 1968: 85, citing Hudig's Delfter Fayence pp77ff) notes that in 1742 potters at Delft used a mixture of four different clays, the most important being a fat clay from Tournai (in western Belgium, near the French border) which was necessary to counteract the lean local clay also used. In the C17 Dutch potters had imported English clay from Norfolk (see above) and possibly Bristol, and in 1691 seven Delft potters claimed English clay to be superior to that of Tournai, but apparently this export trade had ceased at the turn of the century. G.B. Hughes (1961a: 18) makes similar remarks, possibly using the same source though none is cited, talking of English clays being exported to The Netherlands where delftware potters blended it with "two or three native clays" and mentioning the Bristol Dundry clay noted earlier and other West Country clays as being exported (cf remarks in 3: V on English clay being used in the C18 at Saint-Omer). These instances may indicate that Andenne clay did not become important in Dutch ceramic manufacture until the beginning of the C18, in which case Dutch pipemakers may not have used Andenne clay before that time either. (Hendrickx (1963: 156) says that initially Gouda pipemakers used a local white-firing clay already used by Gouda potters and tilemakers, but that it was not suitable for such fine work, causing pipestems to be thick and coarse. Better clay was imported from Rouen, Cologne, and later on from Andenne.)

That Dutch pipemakers in the mid-C17 were using clays from a wide variety or sources - though not, apparently, from Andenne - is evident from a notarized statement of 1644 (quoted in Douwes 1964: 365). In this, one Willem Hendricks stated that clays from "Syberch, Fretsen, and Suitberch" were being used together with French clay, "*Engelsche poelsaert, ende Engelsche Eylewitts aert*", Frederich clay from Münster in Germany, and clays from Hesse, also in Germany. Subsequently, Hendricks also mentions clay from Roosendaal in the southern Netherlands. This writer has so far been unable to identify "Suitberch", but "Syberch" and "Fretsen" are in all probability Siegburg south of Cologne and Frechen just west of Cologne, both famous stoneware-producing centres using local deposits of light-firing clay (cf I. Noël Hume 1970c: 276-85 and refs). *Engelsche poelsaert* and *Engelsche Eylewitts aert* undoubtedly refer to clays from Poole and the Isle of Wight, while the clay from Hesse is perhaps that from Cassel noted by Hendrickx (1963: 157, 158; see also 3: III). The Roosendaal reference is particularly interesting because it implies there was native Dutch pipeclay: Duhamel du Monceau (1771: 7) noted it was alleged Gouda pipemakers got high-quality clay from near Antwerp - Roosendaal is ca.25 miles north of Antwerp - though he doubted this. The Roosendaal deposits may indeed still exist, for in 1969 a pipemaker was still working at Schoten near Antwerp, in Belgium (Lefrancq *in litt.* 9 October 1969; see also 3: IV and V).

There is, however, considerable confusion as to whether or not the export from England of pipeclay was permitted, Oswald (1960a: 43) noting complaints about clay being exported to The Netherlands in 1663 and Duhamel du Monceau (1771: 10) indicating it was forbidden when he was writing. In fact, documentary references of the period are flatly contradictory. In 1627 and again in 1629 the Privy Council permitted the export of pipeclay from Poole, Hampshire, and Kent once the London clothworkers' company had been satisfied the clay was not fuller's earth - in the second reference export to Rotterdam was specifically mentioned (quoted in Mountford and Celoria 1968: 2 no 2, 3 no 4) - and on 26 April 1634 the *Delight* of Scarborough left Boston for Danzig with "15 loads Tobacco pipe earth" (Boston port books, reference in P.K. Wells files), an entry which possibly suggests early manufacture of clay pipes in Central Europe (cf 3: III). In 1650, however, the State Papers Domestic are recording the illegal export of fuller's earth and tobacco pipe clay to Rotterdam and noting instructions to Commissioners of Customs to increase penalties for this offence. In 1661 the same source notes a proposal to impose a tax of 2d a cwt of tobacco pipe clay exported, implying such trade was now legal, and the following year the London pipemakers' guild urged that export of pipeclay to The Netherlands be forbidden as Dutch pipes were being sent to the English American colonies. A 1664 petition from the same guild again asked for the export of pipeclay to be forbidden; in fact an act of parliament of 8 May 1661 had forbidden the export of pipeclay and the London pipemakers' guild charter of 20 April 1663 also included a clause forbidding its export, so one may conclude from the 1664 petition that these strictures were being avoided (see remarks in 3: I below). One Dutch writer notes that ca.1660-1700 stems of Dutch pipes became thicker because wars with England (the First, Second, and Third Dutch Wars - 1652-54, 1665-67, and 1672-74 respectively) stopped the import of superior English clay and forced Dutch pipemakers to make do with German and Belgian clay (Düco 1974: 1st page; cf Friederich 1964d: 5). In 1712 and

1747 there are references to English clay being used in pipemaking in Saint-Omer in northern France (Coolen 1970: 391); on the other hand, Pettersen and Alsvik (1944: 37) note the export of English pipeclay was forbidden in 1752 and Duhamel du Monceau (1771: 10) says that at the time he was writing the export of English pipeclay was forbidden.

(The export of fuller's earth, of similar appearance to pipeclay, certainly seems to have been forbidden, no doubt to protect the English cloth industry: the 1627 and 1629 references above imply its export was forbidden and several references in the *SPD* for 1639 and 1640 indicate this to be the case, even to the extent of petitioning for shipments to northern England to be sent under bond. The export of fuller's earth was still prohibited in 1694, for in that year a clay-merchant with pits near Aldeburgh in Suffolk was accused of sending fuller's earth to The Netherlands in the guise of potter's clay (Weatherill and Edwards 1972: 173); his defence was that it was indeed potter's clay he was exporting - he was also exporting to North America - which presumably indicates that at least potter's clay could legally be exported to The Netherlands at that time.)

By September 1969, when the writer visited Andenne, local clay was no longer being used for pipemaking, the clay used coming from Germany (probably from the Westerwald, though the pipemaker, M Léonard, was unable to confirm this). On the other hand, when the Van der Want pipe factory in Gouda was visited in April 1969, it was said there that the clay used came from the "Liège area". Liège is only ca.25 miles from Andenne and the cliffs along the Meuse for the entire distance comprise a continuous series of clay mines; though in their study of medieval ceramics from Andenne and other pottery centres on the Meuse between Namur and Liège, Borremans and Warginaire (1966: 85 fig 35) indicate the deposits of "*terre plastique*" restricted to bands parallel to but south of and away from the river at distances of from ca.1/2 mile to ca.7 miles, and all in the area between Huy and Namur, a distance of ca.17 miles.

Savary des Bruslons (1759-65 ed: IV, col. 200) notes that pipeclay was used in France to manufacture faience; and faience was being made in various centres in the pipemaking area of northern France, including Saint-Omer, from the earlier C18, and there local clay from St-Momelin and Nieurlet, three and nine miles to the north respectively, was certainly used at least initially (Lesur 1957-60: 922), though neither of these places are near the clay-mining areas of northern France indicated by Duhamel du Monceau as supplying clay to the pipemakers of the area. Under the heading *Argiles maigres du Pas-de-Calais*, Lesur (1957-60: 1328) gives the following figures:

SiO_2	81.3
Al_2O_3	12.7
iron oxide	1.1
chalk	0.3

Unfortunately it is not stated for what this clay is used - the figures are similar to Scott's example SO from South Devon (A.R. Scott 1929: 46, 47) with 80.84% silica and 10.19% alumina but labelled only "silicious clay". Scott's example SR (*loc. cit.*) is in the same range - 77.56% silica and 13.85% alumina - and is called a stoneware clay, but that stoneware clays vary very widely in composition is indicated by a North Devon clay (Scott's example DF, pp48, 49) with 49.17% silica and 33.37% alumina which is also called a stoneware clay (see above). Rouen had been making faience as early as the C16, and in the later C17 experimented with soft-paste porcelain (Honey 1952: 255 and entries cited). On Duhamel du Monceau's evidence the local clay used for pipemaking should have featured largely in these manufactures. Among Brongniart's list of French clays (1854 ed: III, 9-15) are several probably used for pipemaking. Three are noted from the Pays du Bray, mentioned above (Section I) as the region around Forges-les-Eaux which made pipes from local clay in Duhamel du Monceau's time. The three clays, all noted as being plastic, came from Lachapelle-aux-Pots, ca.8 miles ESE of Gournay-en-Bray; Doudeauville, ca.6 miles NNW of Gournay; and St-Samson ca.3 miles south of Forges-les-Eaux, which is ca.12 miles NW of Gournay.[35] All three clays are described as plastic: the first two were used to make coarse stoneware, the third to make *faïence fine et commune* (general refined earthenwares) and glass-foundry crucibles (cf J. and F. Cartier 1968). An analysis is given as follows (Brongniart 1854 ed: III, 16 no 105) for the St-Samson clay:

SiO_2	65.00
al_2O_3	24.00
iron oxide	trace

This represents an appreciably more silicious clay than British pipeclays.

Brongniart also mentions three clays which he specifically says are called pipeclays - examples from Montereau-faut-Yonne, Strasbourg, and St-Victor-des-Oules (pp13-15, nos 129, 153, and 162 respectively). Analyses are available for the first two; the third is noted as being used at St-Quentin-la-Poterie, where as noted in 3: V pipes were and are being made, though at present a red-firing clay is apparently being used. The first-named clay is noted as being used for "*faïence fine, dite terre de pipe, et porcelaine opaque de Criel*"; it was also used by the Montereau pipemaking firm of Gisclon and his successor Dutel which was destroyed by fire in December 1895 (Colas 1959: 234 and 1962: 31). The figures for the Montereau and Strasbourg clays are as follows:

	Montereau-faut-Yonne	Strasbourg
SiO_2	64.40	66.70
Al_2O_3	24.60	18.20
iron oxide	trace	1.60

Both these sets of figures, like the Forges-les-Eaux analysis above, represent clays with a much higher silica content than that for English ballclays used for pipemaking.

(Howe (1914) does not list Belgian sources of kaolin, but he does cover French (pp41-2, map) and German (pp53-67, map) and neither the Pas-de-Calais nor the Westerwald areas have or are near deposits of kaolin. The clays of Seigburg, Frechen, Aachen, and the Westerwald, which were being used to produce a very hard earthenware as early as the C10 and true stoneware in the late C14 (Klein 1955: 7-8) seem certainly to be ballclays. Indeed, in the area south of Cologne there has been a continuous potting tradition from Roman times (Tischer in J. Hurst (ed) 1970: 103), presumably using this same clay. The Raeren and Aachen clays (the former centre has been, since 1919, ca.3/4 mile inside the Belgian border ca.7 miles SSE of Aachen) are briefly noted by Dienemann and Burre (1928: 118).

stoneware. The analyses are as follows:

	Lautersheim	Vallendar I	Vallendar II
SiO_2	49.00	66.70	65.27
Al_2O_3	33.09	24.00	24.19
iron oxide	2.10	1.20	1.00

The Lautersheim clay is very close in composition to the Wareham, Dorest, ballclay noted earlier (50.76% SiO_2, 33.52% Al_2O_3) but the two sets of Vallendar figures are, like the Höhr and French figures noted above, for a markedly more silicious clay than any of the British pipeclays. Lautersheim is ca.12-1/2 miles west of Worms, some 50 miles south of the Westerwald.

On the other hand, the clay deposits on Bornholm used during the second half of the C18 to make pipes and pottery (see 3: III, Denmark) may have been the kaolin deposits described by Howe (1914: 75-7), though the only clay described by Brongniart (1854 ed: III, 5, 16) from Bornholm was a silicious clay - 72.60% SiO_2, 19.50% Al_2O_3, 1.00% iron - used for making the saggars for Copenhagen porcelain.

The clay for the saggars used in firing pipes in fireclay, and refractory clays of this type have probably always been used. Refractories is the name given to inorganic materials with the ability to retain their physical shapes and chemical identities when subjected to high temperatures (Adams 1961: 18). As the saggars have to withstand continued firing, and often take the direct force of the flames, they have to be made of a material which will not be affected by the temperature to which the pipes will be fired, and preferably of a clay which can tolerate temperatures appreciably greater than those normally attained. Fireclays (Adams 1961: 18-19) are sedimentary in origin, comprising essentially a fine-grained mineral of the kaolin group with a hydrous form of mica. Free quartz is normally present, sometimes in considerable amounts, and a number of other minerals are also present including iron which gives it its characteristic reddish colour when fired. However, mineral additions in any large quantity generally lessen the refractory quality of the clay. Rhodes (1957: 313, 1973 ed) gives the following analysis for fireclay:

SiO_2	58.10
Al_2O_3	23.10
Fe_2O_3 and FeO	2.41

Fireclays can be heated to temperatures above 1,600°C without melting (Adams 1961: 18); this temperature is some 400°C above the highest temperature used to fire clay pipes known to this writer (at Andenne, Belgium, where this may be as high as it is only because the pipes seem to be used for bubble-blowing and rifle-ranges) and between 600°C and 700°C higher than the normal temperatures to which modern Dutch and English pipes are fired.

Analyses are available (Timmins (ed) 1866: 137) for deposits of Stourbridge fireclay, the clay famous for making glass-foundry crucibles and noted above in Section VII. One such analysis (sample 1) for a fireclay burning "perfectly white" which made "excellent firebricks and crucibles" gave a composition as follows:

SiO_2	59.87
Al_2O_3	33.49

The Westerwald clays are treated in some detail by Dienemann and Burre (1928: 181-97) and an extensive bibliography, including references to the pottery industry of the area, is included (pp181-2). In the Lower Westerwald region around Höhr-Grenzhausen, which was - and still is - the pipemaking and stoneware-production centre, there are four deposits of pure plastic clay. The largest is in the Wirges area, about six miles NNE of Höhr-Grenzhausen; another is at Ransbach, not quite so far NNE, in which area they still make clay pipes (see 2: IV); the third is a little north of the first, between Mogendorf and Selters; and the fourth, which is the smallest, is in the Höhr-Grenzhausen area itself. Mogendorf is noted in 1789 as being the source of clay shipped down the Rhine to Cologne and there sold to Dutch pipemakers (see 3: III), though at that time it was said by the Dutch, perhaps disparagingly (cf 2: II), to be of poor quality, little used (by the Dutch), and easily done without by them.

There are also major deposits of white clay along the east bank of the Rhine in the ten miles between Erenbreitstein, opposite Coblenz, and Neuweid, downstream near Andernach. The most important deposits here are in the Vallendar and Bendorf area, along the roads running to Höhr-Grenzhausen which is only about four miles to the NE. A very good white clay is also found at Urbar, a mile south of Vallendar. The purest white clay is classified as pipeclay and is used in the production of earthenwares, stonewares, crucibles for glass-production, and clay pipes, and as a good binding clay in the production of refractory wares (p.191); elsewhere (p.195) the authors refer to pipe-production starting after the end of the Thirty Years' War in 1648.

Clay from the Lower Westerwald was known as Vallendar clay because formerly it was shipped from there down the Rhine; by the time Dienemann and Burre were writing in the late 1920s, however, the clay was being shipped mainly by railway from various locations in the area. At that time it was shipped both as lumps and in barrels and a considerable amount went to France, Belgium, and The Netherlands. At that time too the best clay deposits were still being mined in the method which had been standard before ca.1863, by digging simple shafts ca.5 ft in diameter through the overburden, lining it with wooden hoops and posts and straw to prevent collapse, and then widening out the bottom of the shaft in a bell-shaped pattern when the clay had been reached. The clay was then hauled out by bucket and winch. The reason for the persistence of this system was the large number of small independent landowners, which largely prevented wide-scale open-cast mining.

Dienemann and Burre (p.195 example 10) give an analysis for a Höhr *Steinzeugton* (stoneware clay) as follows:

SiO_2	70.12
Al_2O_3	21.43
iron	0.77

Brongniart also lists (1854 ed: III, 6) a number of Rhineland clays, for two of which, those from Lautersheim and Vallendar, he gives analyses (p.16). In the case of the latter, two slightly differing analyses are given. The Lautersheim clay, described as whitish and plastic, was used in the production of *faïence fine*; that from Vallendar was described as ochreous and plastic and was used to produce *faïence fine* and Rhenish

protoxide of iron	3.01

with smaller percentages of potash, lime, magnesia, and soda. The general run of Stourbridge clay analyses, however, and particularly the best clays (e.g. samples 3, 4, 5, 8) have ca.68-79% silica, ca.17-28% alumina - the silica and alumina proportions being roughly in inverse proportion to each other - and ca.2-3% protoxide or peroxide of iron (cf Brongniart 1854 ed: III, 6, 16).

A.R. Scott (1929: 49, example DO) notes a "refractory clay" from the base of a series of Poole ballclays with the following composition:

SiO_2	62.38
Al_2O_3	23.48
titanium and iron	2.50

A clay from Ransbach in Westerwald, near Höhr-Grenzhausen, used to manufacture crucibles for glass manufacture and therefore probably in the general refractory class of clays from which Westerwald pipemakers' saggars would be made, had the following composition (Dienemann and Burre 1928: 195 example 11):

SiO_2	59.15
Al_2O_3	35.61
iron	1.04

(for figures for a stoneware clay from Höhr see the preceding example in Dienemann and Burre's table, noted above).

The sources of Bristol pipeclay have not been examined in this study, but it is perhaps worthwhile to bring together what evidence has been noted in passing. The very sparse evidence at present available suggests Bristol pipemakers used North Devon clay rather than clays from Poole or South Devon - for example, references to shipments of North Devon clay to Bristol in 1691, 1720, 1734-35, 1737, and 1755 (p.233 above) - and it is possibly significant that Willan in describing Poole's coasting trade (1938: 155-7, 1967 ed) does not note any clay destined for Bristol. Two maps based on Willan's survey of Poole trade (Cooksey MS 1: figs 1 and 2) suggest that in the later C17 Poole pipeclay went eastwards along the south coast and up the east coast as far as Newcastle upon Tyne but had little market westwards along the south coast and only one destination on the west coast, Watchet on the south side of the Bristol Channel, while in the earlier C18 little change is suggested to this pattern except that trade westwards along the south coast had increased and Chester and Liverpool had been added as west coast destinations. There is one reference (Willan 1938: 174, 1967 ed) to Bristol receiving clay from Exeter in the year ending Midsummer 1735, and this must be either Poole or South Devon clay being reshipped; however, Bulley (1955: 197) notes that only a little South Devon clay reached Bristol prior to 1770. The question as to where Bristol pipeclay came from, therefore, is far from settled; and supply patterns are at present totally unknown. Of course, with the Bristol tin-glazed earthenware industry commencing before 1650 there should be plenty of references to imported ballclay in the port-books; as noted above, Bristol tin-glaze makers were using Irish, presumably Carrickfergus, clay in 1767, this clay being already used by the Delftfield and Liverpool tin-glaze makers. However, the same 1767 source also noted that local Dundry and "Stacent" clay was mixed with the Irish clay. The possible use of Dundry clay by Dutch delftmakers in the C17 instanced by one source (pp 222-3) is another intriguing statement which could well be followed up; again, a study of the port-books would confirm or deny such a trade.

CHAPTER 3

HISTORY OF THE CLAY PIPE INDUSTRY

SECTION I:
GREAT BRITAIN

In Britain (and indeed elsewhere, as the references below show) a popular pastime last century and even into this century among those interested in clay pipes was to argue whether pipes had existed prior to the introduction of tobacco. Popular names, such as "Celtic", "Roman", "Danes'", "fairy", "elphin", "Mab", "Carles'", "Cluricans", and "Old Man's" pipes, and their recovery on Dark Age or Roman sites, were regarded in some circles as indications that clay pipes could belong to an earlier period than more orthodox historians were prepared to believe, and even Collingwood Bruce, an eminent C19 historian, seriously thought that pipes might be Roman (see Fairholt 1859: 152-9; also Hewitt 1859: 285 and Parsons 1964: 231).

Those who believed in smoking prior to the introduction of tobacco held that native narcotics such as coltsfoot, sneezwort, yarrow, and mouse-ear would have been used, as they were (D. Wilson 1851b: 679 and 1863: II, 504; *N&Q* 10 June 1854: 546, 9 September 1854: 211; Jewitt 1863: 74-5 repeated in 1878: I, 291; R. Thursfield 1863: 82; Apperson 1914: 43; Herment 1952: 116-8, 1965 ed; Berry 1963: 6; Macnab 1972: 260) into this century with potato-leaves, lettuce, and dried tea-leaves in some country districts or when tobacco was scarce or could not be afforded - a Suffolk man, born in 1890, recalls he used to roll some leaves in a bit of brown paper when he had no tobacco; when the leaves were really dry the "cigarette" would sometimes burst into flames (recorded in G.E. Evans 1975: 131) (coltsfoot was identified in a pipe-bowl found in Ireland (Ronayne 1903: 621) and Herment (1952: 117, 1965 ed) notes the use of such substitutes in France during the Occupation). They also quoted Dioscorides and Pliny who noted the inhalation through a tube of smoke from dried coltsfoot as a cure for a cough in Greece and Rome, and Herodotus who noted that the Scythians covered their heads with a rug and inhaled the smoke from hemp-seeds burning on red-hot stones. The Thracians too burnt the seeds of certain aromatic plants and inhaled the smoke.

(For some of the arguments and observations see Croker 1835; W.J.B. Smith 1854; Fitzgerald 1855: 308-10; Anonymous 1856b; Fairholt 1859: *passim*, esp. 152-66; Jewitt 1863; D. Wilson 1863: II, 503-6; Wilde 1863: 159-60; Quiquerez 1864; 1871: 86-7; Hewitt 1869; W.J.B. Smith 1878; Jewitt 1878: I, 291; E.A. Barber 1880a; 1880b; *Enc. Brit.* 9th ed 1875-89: XIX, 111; Cassidy 1895: 17; Lejeal 1897; Molin 1897; Godet 1898; McGuire 1899: 453, 457; various items in *N&Q* during the C19; C19 references noted in Hendrickx 1963: 151-2; T. McK. Hughes 1900; Reber 1900; Penn 1901: 17-23; Sheppard 1902: 6, 1912 ed; Ronayne 1903: 421; Pholien 1906: 138-9; Macartney 1906: 16; Quick 1906: 22-3; T.P. Cooper 1907: 106; T.H. Thursfield 1907: 160; Randall 1908: 441; Amador de los Ríos 1913: 279-83; A. Deane 1914: 4-5; Apperson 1914: 11-12; Reber 1914a; 1914b; H. Scott 1917: 147-8; Fleming 1923: 234-5; A.S. Brown 1923: 15-16; A. Dunhill 1924: 208; Keyes 1931: 19; Herment 1952: 1 and *passim*, 1965 ed and 1954: 1 and *passim*, 1963 ed; Terstraeten 1969: 1; Anonymous 1971a: Atkinson 1972a: 42 and *in litt.* 20 May 1972 with photograph of gargoyle at a church at Lacock, Wiltshire, smoking a pipe and alleged to date to before the conventional dates for the introduction of pipe-smoking to England; Garreau 1972: 38-40; Bastien 1973: 1st and 2nd chapts *passim*).[1]

The writer investigated only one of the pre-last-quarter-of-the-C16 stories "proving" smoking to be an earlier custom than conventionally held: Fleming's story of a carved fireplace lintel at Cawdor Castle in Scotland dated 1510 showing a fox (actually two foxes) smoking a pipe. The lintel, the story goes, is in a wing of the castle built at the time of the inscribed date. (The story occurs in D. Wilson 1851b: 681-2 - repeated in 1863: 505-6 - citing R. Carruthers's *The Highland Note-Book, or Anecdotes and Sketches* (1843) 154; *N&Q* 15 July 1854: 48-9 also gives the story, citing an issue of unknown date of the *Inverness Courier*.) According to the Earl of Cawdor (*in litt.* 7 November 1967) the lintel *commemorates* a wedding of 1510 but is built into part of the castle erected probably in the 1660s - no new construction is known to have been carried out at the castle in the early C16. The style of decoration on the lintel is not, contra the sources quoted, typical of the early C16 but is late Elizabethan or early Jacobean in English terms, and would date in Scotland some 60 or more years later - in other words, to about the 1660s. This would seem to effectively dispose of the possibility that an earlier lintel of 1510 had been incorporated in the new wing, though we are left to conjecture why this event should have been commemorated so much later - conceivably it could have been a modernized replacement of an earlier piece from elsewhere in the castle.

However, there is no more concise summing up of this problem than the remarks of one the Rev. Bryan Faussett, writing 200 years ago and before the craze for dating pipes to Saxons, Romans, or Celts had begun. He records that while digging a large prehistoric burial mound

> we met with nearly a whole tobacco-pipe, of that sort which were [sic] used when first tobacco was used in England.... This lay nearly at the bottom of the highest part of the tumulus. We may therefore, from these circumstances, conclude that this mound was opened not long after the reign of King James the First, or perhaps in it (*Inventorium Sepulchrale:... from A.D. 1757 to A.D. 1773*, ed J. Mayer (1856), quoted in Parsons 1964: 232).

Modern excavators of a Late Neolithic-Early Bronze Age barrow in Sussex similarly used the discovery of an early C18 pipe-fragment to prove that some of the disturbance obvious in the mound had been by curio-hunters of the latter period, and the excavation revealed a classic case of the sort of juxtaposition of artefacts which confused C19 antiquarians - a C19 pipe found in the topsoil with a Roman coin jammed firmly in the bowl (Beckensall 1967: 20-21).

It is extremely sad that even today books with presumably some designs at catching an intelligent audience should continue to cite uncritically "evidence" for medieval or earlier smoking and otherwise be so cavalier with facts; and it is unforgivable that as late as 1972 a scientific journal could have carried an article in which this same "evidence" is repeated. French writers in recent years have been particularly reprehensible in this regard: Herment's *Traité de la pipe* (1952), which has gone through several editions in France and in translation (as *The Pipe*, 1954) in Britain and the

United States - including an American paperback edition (1954, 1963 ed) - since its first appearance is one such example; Bastien's magnificently-illustrated and sumptuously-produced La Pipe published as recently as 1973 devotes two chapters to pre-1492 "evidence" for smoking in Europe and is otherwise tragically bereft of critical history; while Garreau's article "La Pipe en terre" in the Cahiers de la céramique, du verre, et des arts du feu in 1972 (Garreau 1972) similarly repeats the same sort of "evidence". The soundest works on the history of smoking, as noted earlier (p.31 above), are still Fairholt's Tobacco: Its History and Associations:...(1859) and Apperson's A Social History of Smoking (1914) for Britain, and for Europe Corti's A History of Smoking (1930, 1931 ed).

The earliest references to smoking in England have already been noted in 1: V - a reference (presumably to a cigar) in 1556 and another in 1570 to "little funnels made from a palm leaf or a reed" popular among sailors by that time for holding rolled and powdered leaves at one end. Although this latter might technically be held to be a form of cigarette (which form was known in pre-Columbian America) the fact that the tobacco was placed at one end indicates the tube was not a container per se but fulfilled the function of a pipe-stem, so that one is entitled to call these rolls primitive pipes. The earliest reference to pipes in their standard shape occurs in Harrison's Great Chronologie under the date 1573 when it was noted that "In these daies the taking-in of the smoke of the Indian herbe called 'Tobaco' by an instrument formed like a little ladell...is greatlie taken-vp and vsed in England...." (quoted in Dickson 1954: 132, see also Penn 1901: 30). As noted earlier (1: V), Thomas Hariot, one of the settlers of the first English colony in Virginia, in 1585-86, wrote in 1588 that the colonists adopted the local Indian custom of smoking with clay pipes and that they continued to do so after their return to England. Following this, and the rapid rise of smoking especially among courtiers, the manufacture of similar pipes in England must have begun. (The earliest use of the word "pipe" in English to mean a tobacco-pipe appears to be in a translation into English made by John Florio in 1580 of Cartier's Brief Recit of his first two voyages to Canada in 1534 and 1535-36, which had been published in Paris in 1545 (Mackenzie 1957: 69-70; cf Dickson 1954: 115 n.46). This reference is 14 years earlier than the earliest reference listed in the OED.)

If Hawkins initially introduced smoking, it must have been with the two-piece pipes he saw in Florida, and the description of pipes in 1573 as "little ladles" does not preclude their being two-piece pipes. Indeed, Aubrey, writing ca.1680 (quoted in A. Dunhill 1924: 225; cf W.E. Brown 1959: 240) said that smoking in the Malmesbury area, his part of north Wiltshire, first came into fashion with a Sir Walter Long and that silver pipes for the gentry and ones with a walnut shell for the bowl and a straw for the stem were the earliest ones. Aubrey, however, is held to be by no means an accurate historian and was writing a century later. It is possible that he was recording a recollection of the earliest days of smoking, before the Virginia Indian clay pipes had arrived, though it is more likely that his latter remark was a recording of a makeshift invention used by country folk before clay pipes became common in country districts.

Malmesbury however, is in the area of the C17 English tobacco industry, and pipes typologically very early are known from Wiltshire (W.E. Brown 1959: 240). Tobacco-growing was being attempted in England as early as 1571 according to MacInnes (1926: 75) so that it is conceivable that it had reached the Cotswold area before the clay pipe and that Aubrey's straw and walnut-shell pipes were a local adoption of the two-piece pipes seen by Hawkins in Florida. The first mention of tobacco-growing at Winchcombe in Gloucestershire is, according to MacInnes (1926: 83), in 1626 - A. Dunhill (1924: 206) states that tobacco was being grown there by 1586 but gives no source for this statement. One would have thought the heat conductivity of silver would have made such pipes extremely uncomfortable to smoke, but other references, and one actual specimen, suggest they were used. One of the earliest works in English on tobacco, Anthony Chute's *Tobaco* published in 1595, mentions earthen and silver pipes (Dickson 1954: 98; Mackenzie 1957: 90) as does a Dutchman, Emanuel van Metteran, writing in 1598 (Brongers 1964b: 17 and 19), and another Englishman, Sir William Vaughan in his *Naturall and Artificiall Directions for Health* of 1602 (Laufer 1924b: 35); and one silver example, datable to ca.1620-40, is known (Oswald 1959c: 207). There is also a reference to one in 1686 (Lindsay 1927: 69, 1964 ed). A story set in the time of James I (Fairholt 1859: 161 n.) noted that at that time it took 25 pipefuls to smoke an ounce of tobacco, which not only indicates the small size of the pipes but shows that to smoke a pipeful of tobacco cannot have taken very long, so that relatively little heat may have been conducted by metal pipes. Kingsley in *Westward Ho!* has Martin Frobisher and John Davis smoke long silver pipes, but this may have been inspired by Aubrey's account. That metal pipes were known this early is suggested by a source - of unknown accuracy - quoted by Fairholt (1859: 171 2nd n.) noting that Captain Miles Standish, who founded the colony of Massachusetts at Plymouth in 1610, brought with him in the *Mayflower* and used until he died a small iron pipe "about the size and shape of a common clay pipe." Fairholt does not specifically say the pipe still existed, though Penn (1901: 149) does. (For references to other metal pipes see Appendix I and Section VI below.)

An illustration appearing in 1590 (reproduced by A. Dunhill 1924: 210-11, fig 202) shows an Indian pipe from Virginia which is certainly extremely similar, save for its large size, to early English pipes (cf Oswald 1961: 59 types 1 and 2, 56-7); and the assertion that the English clay pipe industry developed following the bringing to England of Virginia Indian pipes by the returning colonists in 1586 seems very likely to be correct (cf Oswald 1959c: 201-2, 204 fig 3(14)-(17); 1960a: 42). The Duke of WÜrttemberg does not refer to smoking in England in his carefully-kept record of his visit in 1592, but Hentzner in 1598 and Platter in 1599 record the phenomenon, and imply the use of one-piece clay pipes - Hentzner notes they were specifically made for smoking (Dickson 1954: 194-6), which indicates the existence of a London pipemaking industry by that date. The earliest pipemaker recorded so far, however, is one Peter Takel of Barnstaple who was making pipes by 1599, for in that year he made an agreement to supply two gross a week for 9d a gross (quoted in E. Watkins 1966: 217; she is citing a label accompanying pipes in a case in the Barnstaple Atheneum seen by this writer, but it has not been possible to trace the original source).

For the first half of the C17 the London area was the major centre for pipemaking: its trade and influence spread widely over England ca.1580-1630

(Atkinson and Oswald 1969: 201 and 203, 204) and it was here that a pipemakers' guild was set up in 1619. Unfortunately, references to this company are extremely confused, and most of its records appear to have been lost. Ditchfield (n.d.) describes many London companies, but makes no mention of the pipemakers'; Unwin (1904; 1908) makes only brief references to the company's existence. The following pages attempt to summarize what has been stated, however conflicting, and to include the evidence of the three C17 charters of the guild, in order to assist any future study. It was already in manuscript form when Woodman's account of the guilds appeared in Atkinson and Oswald 1969: 172-7. By a curious coincidence the research by Woodman and that by this writer each produced findings largely unnoted by the other, and as Woodman's study is readily available his material has not been repeated here. (Unwin (1904: 262, 1967 ed) lists the following documentary material on the company - 1619 *SPD* cix.160; 1620 *SPD* xcv.53, cxv.104, cvi.83; 1627 *SPD* lxxxix.12; *Privy Council Records* 19 August 1638; 1662 *SPD* lii.32, lx.9, lxi.12; 1663 *SPD* lxxii.70; 1664 xcvii.65.)

According to Jewitt (1863: 77, repeated in 1878: I, 295), T.H. Thursfield (1907: 160) quoting Jewitt, and - probably quoting them without acknowledgement - T.P. Cooper (1907: 104) and G.B. Hughes (1961b: 1633), the company enjoyed a monopoly of making pipes from 1601, although it was not regularly incorporated until 18 years later. This is based on a remark by Robert Cecil, Elizabeth's Secretary of State, recorded in Sir S. D'Ewe's *The Journals of all the Parliaments during the Reign of Queen Elizabeth* (1682) p.651 where such a monopoly is mentioned on 24 November 1601. The context was an uproar in the House of Commons about monopolies in general, and Cecil, urging "Zeal with discretion" in protesting monopolies, advises that the Queen be petitioned. He continues:

> One [Member] would have had us proceed [against monopolies] by Bill, and see if the Queen would have denied it: Another, that the Patent should be brought before us and cancelled; and this were bravely done. Others would have us proceed by way of a Petition, which Course doubtless is best; but for the first, and especially for the second, it is so ridiculous, that I think we should have as bad success as the Devil himself would have wished in so good a cause. Why, if idle courses had been followed, we should have gone forsooth to the Queen with a Petition to have repealed a Patent of Monopoly of Tobaco Pipes (which Mr Wingfields note had) and I know not what conceits: but I wish every man to rest satisfied till the Committees have brought in their resolutions according to your Commandments.

It is not clear why a petition against a pipe monopoly should be deplored when the use of a petition to the Queen on monopolies generally is extolled, but it seems quite clear that by 1601 there was a pipe monopoly, presumably on their production. (It is also unclear whether the reference to Mr Wingfield refers to the Member who had moved the action or to the holder of the monopoly.) Oswald (*in litt.* 14 August 1969) notes that Chalkley (in correspondence) asserted there was such a monopoly in 1601 but never gave any source - whether he was using D'Ewe or some other source is unknown. No other reference to a pipe monopoly this early appears to be known.

A letter (PRO ref. SP 14/98) dated 20 August 1618, almost 14 months before the first chapter was granted to the Westminster pipemakers' guild, refers to pipemaking monopolies in the following terms after mentioning various new taxes and laws: "and not so much as Archie the dizzard but that hath ingrossed the making of tobacco-pipes to him his deputies or assignes, which though yt seeme a small matter, yet they say yt concerns a number of poor men." Archie the dizzard appears to be a reference to Archibald Armstrong, the Court fool - dizzard means fool - but there is no record of Armstrong getting such a monopoly and the expression seems simply to mean that any Tom, Dick, or Harry could now get a document allowing him to make tobacco-pipes to the exclusion of others in the same trade. This would certainly imply that quite a number of monopolies were being granted at this time.

The first charter (PRO ref. C.66/2206 Patent Rolls 17 Jas. I, 5 Oct. No.6), dated 5 October 1619, strongly implies there had been no control of pipemaking prior to that date, for its raison d'etre is given as repairing the disrepute brought about by inexpert makers and the growing number of "loose and idle persons intruders into that trade", and to organize the trade and supress "unskillfull" makers (Robinson and Spence 1937: 200, confirmed in SPD). However, the very references to intruders and inexpert makers may reflect the monopolies given to Tom, Dick, and Harry in the preceeding years. It seems clear that the 1619 charter is the first attempt to organize the industry on some rational basis, which suggests that the earlier "monopolies" apparently dating to at least as early as 1601 were quite different in their application and terms of reference. (Robinson and Spence also say the Company's by-laws were framed on 6 October, but this has not been confirmed.)

As the present reconstituted company points out (Anonymous n.d. [27]) the original company was that of the Tobacco Pipe Makers of Westminster in the County of Middlesex (so 1619 charter), and was not, as is generally implied (e.g. Fairholt 1859: 166-7 quoting Stow; and following him T.G.H. Price 1900: 229; Pritchard 1923: 167; Oswald 1960a: 40), a London company. However, its rights extended throughout England and Wales: no person not a member of the company was to make pipes anywhere in these countries, and the company had the right to search shops, warehouses, and ships for unlawfully-imported pipes. These rights were typical of royal monopolies of the period - the Society of Soapmakers of Westminster, for example, founded in 1632, had similar privileges and was able to use them to break the Bristol soapmakers' guild (F.H. Rogers 1949: 156-7).

A.S. Brown (1923: 17 and 19) quotes a royal proclamation (he dates it 20 May 1620 but F.H. Rogers (1949: 165 n.2) says 27 May and this is confirmed by the SPD) which mentions the Westminster pipemakers' charter of the previous year - though its date is given as 6 October - and expresses displeasure that the monopoly given the company and intended to cover England and Wales was being broken. Those causing the royal displeasure are noted as being in London, Middlesex, and Surrey - they were fortifying their houses to resist attempts to stop their work, and the proclamation allowed two of the company's members, together with a law officer, to enter and search any suspected place. (There is a considerable confusion here in the literature. Robinson and Spence (1937: 201) refer to these powers and give

August as the month, and in fact appear to be referring to a second proclamation of 30 August (F.H. Rogers 1949: 165 n.3). Rogers (confirmed in the SPD) claims the search authority was contained in the second proclamation, but Brown (loc. cit.), quoting verbatim, notes it in the earlier one. Presumably it was in both - there appear to be no search rights specifically against non-members given in the 1619 charter, a flaw which the proclamations of 1620 were perhaps designed to rectify.)

As constituted, the company comprised a Master, 4 Wardens, and 12 Assistants; in addition 19 other names are listed as, in effect, charter members, which gives a total - including two Masters-elect - of 38, indicating that there were at least this number of pipemakers in the London area by 1619. (The electoral system is noted in 6: II(c)(2), when the structure of the Bristol pipemakers' guild is considered.)

(Fairholt (1859: 166) refers to the guild as having a Master, four Wardens, and "about twenty-four Assistants." This is repeated by Jewitt (1863: 78 and 1878: I, 295) and T.G.H. Price (1900: 229) - both probably quoting Fairholt without acknowledgement - and by Pritchard (1923: 167) - who does give Fairholt as his reference. Penn (1901: 149) states flatly there were 24 assistants. Harley (1963: 12) also states that there were that number and goes on to say, in quotation marks, that the company was, "'to be active in London, Bristol, Selby and Hull'". Where this statement is taken from is not mentioned, but it is not in the 1619 Charter, which is where Harley implies it is. This is but one of quite a number of inaccuracies in Harley's work.)

The company, however, had a brief existence, for a proclamation of 1621 abolished, amongst other evils, "the sole making of tobacco pipes" (Robinson and Spence 1937: 201-2).

The company appears to have been backed by, or perhaps more realistically was a pawn in the hands of, four courtiers who had been instrumental in obtaining the charter and had sunk £3,000 into the venture. What follows is not clear: Unwin (1908: 319, 1963 ed) talks of the Mayor and Recorder of London trying to "make friendly accord" among the four courtiers (SPD 24 June 1620), but it is not clear whether they had fallen out among themselves or with someone else. Unwin goes on to say that soon after the accession of Charles I these financiers found their interests threatened by another court favourite (probably Sir Thomas Willoughby referred to in 1627 (SPD Charles I p.493) as a rival claimant to the monopoly), and "ultimately the old charter was declared invalid and a new one granted on condition of the payment of £100 a year to the king." This suggests the first charter, elsewhere noted as being withdrawn in 1621, continued until after Charles I's accession in 1625, for the new charter mentioned appears to be the second, granted in 1634, as the payment noted above is that recorded in this charter. However, the 1627 SPD reference referred to is a petition from the three individuals - Thomas Warricke, Robert Maxwell, and Charles Maxwell - to whom the first charter was specifically granted asking that Willoughby not be assisted in his attempt to obtain the monopoly "originally granted by James I to the petitioners to their loss through the falsehood of the company of £3,000". This indicates the company had foundered by 1627 but that its backers were still hoping to salvage their investment.

The second charter (PRO ref. C.66/2645 Patent Rolls 10 Chas. I. (No.5)) is dated 4 December 1634. It was granted to a group of 24 individuals, eight of whom appear among the names in the 1619 charter. Warricke and Robert Maxwell again play a leading part, they and Richard Mathewes and Richard Cox asking for the charter on the grounds that some of the petitioners (whether this means of these four or of the other 20 listed later is not clear) had discovered a way of firing pipes from "Seacole or pittcole" instead of wood which had hitherto been used "to the consumption and greate decay thereof". It can thus be concluded that Warricke and the Maxwells had successfully fended off Willoughby and eventually regained their monopoly, which is not Unwin's interpretation. The Maxwells, in view of their Scottish name, may well have been favourites of James I, who was very prone to have such courtiers. James's favourites were very unpopular, and it may well have been that with his death there was considerable jockeying for position, such as Unwin implies, when Charles I succeeded. There is a slight suggestion that Mathewes and Cox may have been the pipemakers who had found out how to fire pipes with coal, Warricke and Robert Maxwell being their backers. By the early C17 there was a great scarcity of good timber because so much was being used in industry (see 2: II), and the promise to use no wood for firing was clearly designed to obtain royal favour (the 1619 charter specifically allowed pipemakers to use any fuel they wished). The company was to pay a yearly rent of £100 in two equal portions, a marked contrast to the 44s rent mentioned in the 1619 charter and no doubt indicative of the growing financial difficulties of the Crown during this period. (The electoral system was the same as that given in the first charter.)

(Oswald (1960a: 42 n.5) notes a Maxwell and one Kirk - again another Scottish name - as being granted a monopoly apparently sometime after 1619 to supply pipeclay in return for instructing pipemakers on how to fire pipes with coal - this appears to be a distorted version of the granting of the second charter. For a discussion of the clay monopoly see below, also 2: IX. Robinson and Spence (1937: 202) give the date of the second charter as 1633, but this is incorrect; to add further confusion they list (p.203) an entirely different set of officials to that given in the 1634 charter. The list they give is in fact one of early C19 makers - all but three of the 24 names can be identified either from Bloice's list of London pipemakers taken from C19 directories (in Atkinson and Oswald 1969: 216-25) or from Oswald's earlier list (1960a: 55-102) as working in the first 30 or so years of the century.

The pamphlet published by the present Company (Anonymous n.d.[27]) gives the date of the second charter as 10 December 1634 instead of 4 December, and also says that the title of the company was changed at that time to that of the Tobacco Pipe Makers of London and Westminster and England and Wales, but the charter in fact gives exactly the same title for the company as that given in the first charter. This source also notes that the charter was forfeited for non-payment of rent, the Civil Wars - commencing in 1642 - probably contributing to the dissolution of the Company. Oswald (1960a: 42) quotes a source indicating that the company was still active in 1643 (see below), but in fact the guild was ended by a proclamation of 31 March 1639 which cancelled the grants of incorporation to a motley group of manufacturers, including hatband, spectacle, gutstring, comb, and tobacco-pipe makers (Robinson and Spence 1937: 203, F.H. Rogers 1949: 165 n.4; Pearl 1961: 87).)

The third charter of the company (PRO ref. C.66/3040 Patent Rolls, 15 Chas. II. (No.7)) was dated 20 April 1663, and here the title of the company is changed to that of the Tobacco Pipe Makers of the Cities of London and Westminster and the Kingdom of England and Dominion of Wales. As with the second charter the guild promised to use only coal for firing pipes. There was to be a Master, 4 Wardens, and 15 or more Assistants. The annual rent was to be four nobles, obviously a largely nominal sum, the age of monopoly-granting to gain money for a hard-pressed Crown being by now over. This charter does not give a date for the termination of the preceding charter, but it does note that the rent had not been paid and that the Letters Patent "have been long since forfeited and voyd".

The charter prohibited the importation from overseas of any kind of tobacco-pipe and also, repeating an act of parliament of 8 May 1661, forbade the export of any pipeclay. The guild was to have rights of search, with the assistance of a constable, of shops, houses, cellars, warehouses, and ships for any imported pipes or exported clay.

(According to the present Company's pamphlet (Anonymous n.d.[27]) the company was re-incorporated on 29 April 1663 and recognized as a City Company without a grant of Livery on 2 July. Rogers (1949: 165 n.5) gives a date for incorporation of 21 September 1662 (see below). Further confusion is added by a reference (Robinson and Spence 1937: 204) to a petition in the Calendar of State Papers dated 7 March 1662 (confirmed in the SPD) from the "Masters, Wardens, etc., of the Company of Tobacco-Pipe Makers" requesting assistance against Dutch inroads in the colonial trade and "unskilful persons" making pipes for the home market, which suggests the guild was already in existence. This seems contradicted by a quotation from the same source dated 21 September 1662 (confirmed in the SPD) about two pipemakers, Thomas Lyddall and Mathew Warner, requesting incorporation "under such constitutions as formerly made" (presumably a reference to the previous charters), but the confusion must lie in the use of the old dating system when the year started on 25 March: in this case 7 March 1662 would be 1663 new style. The March petition is presumably a formal application for the charter granted the following month, though its terms suggest the officials had already been elected. (The reference to these officials does not appear to relate to officers of the previous companies, for the 1663 charter's Master, Wardens, and Assistants do not include any of the names mentioned in the 1619 and 1634 charters). Curiously, the two individuals, both pipemakers, who submitted the September petition do not appear in the 1663 charter's list of officials.

On 29 April 1664 (F.H. Rogers 1949: 165 n.6; confirmed in the SPD), the guild asked for a reconfirmation of its powers because so many people were flouting its authority (T.P. Cooper 1907: 104-5). As noted above, the present Company says the company was re-incorporated on 29 April 1663 - it seems likely there is a confusion between 20 April 1663 (the date on the charter) with 29 April 1664 (the date of this reconfirmation). Harley

(1963: 12) quotes John Aubrey to the effect that Charles II confirmed the guild's charter in 1675, but neither Harley nor Aubrey is a reliable source and the statement is probably erroneous.

According to T.P. Cooper (1907: 104) and Oswald (1960a: 43, 47), the company, at the same time as it received its new charter in 1663, petitioned parliament to forbid the export of pipeclay to The Netherlands as Dutch pipes damaged the market for their own pipes. This, these sources say, was granted in return for a promise to use only coal for firing pipes. In fact, these points were incorporated into the new charter - this may be the petition of 7 March 1662/3 referred to above but in any case there had also been the act of parliament of 8 May 1661 noted in the 1663 charter. (The whole problem of prohibitions on pipeclay exports is full of contradictions - see 2: IX).

According to T.P. Cooper (1907: 104-5) and Lipson (1931: 282, 1956 ed) the guild asked in 1664 (the SPD give the date as 16 December) for their trade to be included in the Statute of Apprentices or Artificers (sometimes miscalled the Statute of Labourers) whereby only those who had served a seven-year apprenticeship could become pipemakers - they noted their "threatened ruin because cooks, bakers, and ale-house keepers and others made pipes, but so unskilfully that they are brought into disesteem". As all three charters were equally specific about apprenticeship it seems likely that the guild was in fact trying to refute an argument that because its trade had not specifically been included in the 1563 Statute of Apprentices pipemaking was exempt from its provisions. (In the following century it was to be held that the Statute was non-retroactive - that is, trades not specifically mentioned in it were excluded from its provisions. This applied to the growing industries in the North and Midlands in particular, though apprenticeship was normally replaced by a seven-year indenture (Ashton 1955: 223-4, 1961 ed).) (It is possibly a misreading of this request that leads Hughes (1961b: 1663) to state that this Statute specifically included a reference to pipemakers when it was promulgated in 1563. Mackenzie (1957: 79) notes this error, but refers to a five-year apprenticeship. He also says that "years later" (i.e. subsequent to 1563) the London pipemakers appealed to the Statute to stop Bristol pipemakers cutting them out, but this writer has been unable to verify this statement and it is unclear on what grounds such an appeal could have been made. Bristol pipemakers certainly followed the customary seven-year apprenticeship (see 6: *passim*).

Few references to the guild in the C18 have been found, but T. Waller's *A General Description of all Trades*... of 1747 notes (p.167) that the company was 78th in precedence as a City company and that it had neither Hall nor Livery; another source of the same year (R. Campbell 1747: 337, 1969 ed) also notes the company was 78th in precedence.

Robinson and Spence (1937: 208) note the new by-laws of the "Worshipful Company of Tobacco Pipe Makers, of the Cities of London and Wesminster (and the Kingdom of England and the Dominion of Wales)" dated 23 January 1805 forbidding the employment of "unskilful and unfit persons, as women and young girls" as this resulted in poor products - no women were to be employed except the widows of men who had been in the trade for at least seven years. No member of the company was to "carry or cause to be carried, any Tobacco Pipes about the Street...hawking or offering to sale [sic] the same...." By the rules and ordnances approved by the Lord Chancellor and the Chief Justices of the King's Bench and the Common Pleas on 3 April 1821 (Robinson and Spence 1937: 208) admission was by "Patrimony (Birth), Apprenticeship for 7 years, working at the trade unmolested for 7 years, or by serving His Majesty in the Army or Navy". The charter gave the guild jurisdiction over all pipemakers in England and Wales, but the guild did not extend this right beyond 20 miles round London. Not so long before 1821 it destroyed defective moulds, and at that time officers could and did enter shops within the 20-mile radius warning any person who was not entitled to the freedom of the company and fining the master if such a person was not discharged. (This aspect of the Guild's function, and the losing battle carried into the 1850s by the Guild to try to assert its authority, is described by Woodman in Atkinson and Oswald (1969: 175-6).)

(G.B. Hughes (1961b: 1633) says that after the incorporation of the guild in 1619 its monopoly was confirmed by subsequent monarchs until 1821, when George IV failed to renew it "being influenced by the makers of the more sweetly smoking briar pipes, then newly introduced." Hughes is not a reliable source, and brier pipes were certainly not appearing until some 35 years after 1821. Pritchard (1923: 168) notes that according to one source (given only as "Marryat" but probably Joseph Marryat's History of Pottery and Porcelain... of 1857), the company petitioned Queen Anne for a charter of incorporation but this was not allowed. Presumably his reference is in error, for the guild was already incorporated and appears to have remained so until ca.1870. Perhaps the request was for livery.)

Between 1801 and 1833 there were 528 members admitted by patrimony or apprenticeship, though as there were only 316 members in 1833 there must have been a high attrition rate. Moreover, how many of these 316 were working pipemakers, and how many of these (if any) worked outside London, is not stated. Presumably these members included journeymen and not just masters. (The list of officers given in Robinson and Spence 1937: 202 is almost certainly that for 1821, and is presumably meant to be attached to the seventh paragraph on p.208. The list gives a Master, 4 Wardens, and 19 Assistants, which last number indicates that the guild had taken advantage of the 1663 clause allowing it to have more than 15 Assistants if it wished.)

Woodman (in Atkinson and Oswald 1969: 177) records that the last enrolment in the Chamberlain's books of an apprentice bound to a citizen and tobacco-pipe maker was in March 1852 and the last admission of a freeman of the Company to the freedom of the City was in January 1868. In 1869 the Company is omitted from the list of City companies listed in the City Corporation's official pocket-book, so presumably it died in 1868.

The present Company, under the title the Company of Tobacco Pipe Makers and Tobacco Blenders, was formed on 24 March 1954. On 5 March 1956 it was granted a coat of arms based on that of the old company, with allegedly their old motto Producat Terra. On 20 December 1960 Livery was granted (Anonymous n.d.[27]). The original coat of arms (Fairholt 1859: 167 and illus., quoting Strype's edition of Stow vol II p.247 and Allen's History of London; Pritchard 1923: 167-8, quoting C. Welch's Coat-Armour of the London

Livery Companies, 1914; Robinson and Spence 1937: 200, no source given; full depiction in an illustration of ca.1800 in Oswald 1970c: pl 206) differed markedly in detail from the modern one, which is depicted in full in Anonymous n.d.[27]. The original motto, according to all available sources, was "Let brotherly love continue," not Producat Terra.

According to Brongers (1964b: 35) one of the reasons James I granted the company its charter was to control pipe production, especially the production of the Ralegh pipes noted in 1: II(h). James had disgraced Ralegh in 1603 and had had him executed in 1618. Brongers goes on to say that James, finding himself unable to control pipe manufacture because those makers outside London ignored his commands, threatened to jail recalcitrant makers and that this added to the numbers who left for the Continent. While it seems reasonable that the Ralegh pipes may, initially at least, indeed represent Ralegh; and that James, who was both anti-smoking and anti-Ralegh would have been angry at any widespread appearance of these pipes, it seems on the basis of the evidence noted in 1: II(h) that these pipes are not of English origin (see also I. Walker 1972b).

It seems, therefore, that there is considerable uncertainty about the history of the Company, which reinforces the impression that it was never able to enforce its theoretical power - certainly not over all England and Wales as their charters implied. Indeed, as Oswald notes (1960a: 47), the existence of independent guilds at York and Bristol - the latter founded in 1652 - and a guild of grocers, apothecaries, and tobacco-pipe makers founded at Gateshead in 1675 (Parsons 1964: 241-2 and pl XIII) indicate that the Company was not recognized in these areas, and anything less like the guild at Gouda in The Netherlands with its dictatorial powers over every aspect of trade (Helbers and Goedewaagen 1942: passim) is difficult to imagine. Brongers's source for his statement about Ralegh pipes being the major target of James's wrath is not given, and this writer has not been able to find any confirmatory evidence. However, R.H. Cooper (in litt. 29 July 1968) notes that a few years before the outbreak of the Civil War in 1642 members of the London Company visited Southampton to search out any unlicenced pipemakers, so some efforts were made to enforce the monopoly beyond the London area. One signatory of the 1619 charter, Swithin Bonham, is described earlier the same year in a document allowing him to exploit Poole clay for tobacco-pipe manufacture as a gentleman of Poole (Cooksey MS 1), a major source of pipeclay in the C17 and C18 (see below; also 2: IX), so possibly the Guild had a more effective writ than has generally been supposed.

As Oswald notes (1960a: 47; 1961: 55), most of the records of the Westminister-London pipemakers' guild are lost, but in view of the variety of and the disagreement among the sources cited in the preceding pages, a re-examination of the Company's history might be worthwhile.

The granting of such monopolies was standard policy in the first half of the C17, as can be seen from the unsuccessful attempts between 1615 and 1638 to make tobacco-importing a monopoly (see 1: V). According to Oswald (1960a: 42 n.5), a monopoly to supply clay for pipemaking was granted to Messrs Kirk and Maxwell in return for their services in securing the incorporation of the tobacco-pipe makers in 1619 and for instructing them in how to fire pipes with coal. T.P. Cooper, however, states (1907: 104) that a Philip Foote of London obtained a licence in 1618 to sell clay for pipe-making for 21 years, and that a little later his brother William was granted for right as Philip had died "and bad clay [was being] sold by others."

That Kirk and Maxwell had some sort of monopoly on pipeclay, and that it continued for a considerable time (or at any rate its holders claimed it did) seems evident from a suit in the early 1640s between George Kirk and James Maxwell - presumably the Kirk and Maxwell of the reference of ca.20 years earlier - and Alexander Fellows, who was apparently a Poole entrepreneur (Cooksey MS 1, quoting SPD Charles I p.567, 1641-43). Fellows had rented ground at Purbeck "fit for making of tobacco pipes and brought a barque thereof to London in Contempt of the Kings Grant," which clay had been seized by agents of Kirk and Maxwell. Fellows had "violently rescued" part of his clay "by breaking up the whare house in which it was stored" and sold it to pipemakers. Fellows alleged that all this time he had been waiting for an answer to "his first petition to the Lords," but he had subsequently returned to Purbeck and brought another barque of clay to London, which had also been seized and again rescued by Fellows "with the assistance of one Elliott". Kirk and Maxwell also claimed that Fellows was apparently "either a chief exporter of tobacco pipe clay or an assistant thereto for information was given to the Attorney General about Michaelmas last of 200 tons transported to Rotterdam last summer by one Cornehill, a partner of Fellows...." Over 25 years later, Thomas Cornell, merchant, was still working in association with Fellows and hiring boats to supply pipeclay to 15 ports from Plymouth to Newcastle upon Tyne, Fellows having the right to sell clay to the people of Poole (Cooksey MS 1, citing document of 1669, DRO no 9366). From this it would appear that Fellows and Cornell survived the attempts of Kirk and Maxwell to enforce their monopoly.

Whatever monopoly Kirk and Maxwell had in the 1620s and 1630s, however, Philip Foote certainly had a monopoly too, for it is noted in at least two documents in the Public Record Office. One, E.178/4242, is a writ to find whether "Phillipp Foote" of London, a cooper, had discovered any means "to prepare clay or earth of such Composicion, temper and quality as hath benefitt and good for the use of Tobacco pipemakers to make thereof their Tobacco-pipes" as specified in Letters Patent granted him on 24 July 16 Jas. I (1618); whether he had used or now used "any mixture or art at all in the mingling or preparing of the clay or earth" for sale to pipemakers or whether he sold it as taken from the ground; whether others used the same clay as Foote had undertaken to sell and if so how long they had used it before Foote's undertaking; and whether Foote had paid the annual rent of £6 13s 4d as specified in the Letters Patent. The result of the inquiry, held in the "Towne Court House" in Westminster on 24 September 21 Jas. I (1623) gave the answer no to points one, two, and four; and noted in answer to point three that on 1 May 10 Jas. I (1612) and prior to that a Lambeth potter named Peter and an East Smithfield distiller called Walters (a blank is left for each christian name) had supplied and used the same type of clay as Foote had undertaken to sell. This indicates that Philip Foote was still alive in 1623, so if T.P. Cooper is correct in saying Philip's brother

William continued the monopoly Philip's death must have occurred after that date. Presumably Philip was able to continue to hold his monopoly despite what seems to be an extremely adverse finding by the inquiry.

The other document, PRO C.2/38, has recently been transcribed by R.H. Cooper, to whom I am grateful for information on its contents (in litt. dated 8 October 1968). It concerns an infringement of Foote's patent - which here is dated not to 1618 but to 18 July 1620 - to be the sole supplier of clay for pipe manufacture (which he was obtaining from a John Overy of Hartley, Kent) "in this Realme of England or the Domynion of Wales". This document notes Foote was a citizen and cooper of London. Presumably this Philip Foote is the same as that listed as one of the first Wardens of the Westminster pipemakers' guild in its 1619 charter. (This charter also mentions an Alexander Foote, but no William.)

According to Oswald (1960a: 43) the monopoly in clay was withdrawn in 1639: this date would coincide with the end of the 21-year licence granted Foote in 1618. (The SPD for the years 1638-40 have several claims and counterclaims by those trying to continue a monopoly in clay and those protesting the illegality of these actions.) There is no reason why such a monopoly should not be granted before the formation of the pipemakers' guild and its monopoly, for pipemaking had been a going concern in London from well before 1600. The whole question of clay monopolies may always have been one of confusions and rivalries, however, for Cooksey (MS 1) has found two agreements for the exploitation of Poole clay for tobacco-pipe manufacture during this period. The first (DRO J.45), dated 17 April 1619, was between Swithin Bonham of Poole - who as noted above was, like Philip Foote, a founder-member of the Westminster pipemakers' guild - and Sir John Webb, allowing Bonham to exploit land belonging to Sir Thomas Brudenell of Deane in Northamptonshire for a period of seven years; the second (DRO, number not given) may have been a re-lease of this land, this time to a William Cooper also of Poole - like Bonham, described as a gentleman - by Brudenell directly and for 21 years, and was dated 19 November 1625. Both leases were for an annual rent of 10s to be paid semi-annually on Lady Day and Michaelmas; Cooper was given 15 days' grace for late payment, five more than Bonham, but agreed to pay Brudenell £4 10s for any default in rent payment. On the face of it these agreements contradict the Foote monopoly, which seems very strange when one considers Foote and Bonham were both Westminster guild members and can hardly have been ignorant of each other's grants. Hopefully, further research will be done on all these various agreements.

London, as already noted, was the major pipemaking centre during the first half of the C17. Successfully appealing against a tax imposed on pipes, the Westminster company claimed that

> near 1000 poor people in London and Westminster lived in tobacco pipe making who now for want of such employment are beggars. Several thousands of other tobacco pipe makers throughout England and Wales are in like manner ready to starve (quoted in Oswald 1960a: 42).

It went on to claim that the pipe industry had been cut to an eighth, foul pipes were being reburnt, and the sea trade was being lost. (Oswald gives the date here as 1643 (also given in Oswald and James 1955a: 187), but this appears to be an error, as the guild had been dissolved in 1639 - see above.) (According to Latimer, however (1900: 72), an excise duty on "tobacco pipes of all sorts, to be paid by the first buyer, for every grosse four pence" was imposed by Parliament in July 1644, so apparently the 1643 success was short-lived.) Oswald notes (1970b: 227-8) 106 London pipemakers recorded in the period 1600-50 and 224 for the period 1650-1700, and suggests that when other as-yet unknown pipemakers and the assistants likely to have worked with each pipemaker are included 1,000 connected with the trade ca.1643 may not be so far from the mark. However, in citing a source of ca.1800 that seven Liverpool pipemakers employed 60 men and as many women as grounds for there being a considerable number of pipemakers' assistants in the earlier C17 Oswald is juxtaposing a C19 industrial concern with the small family business of the earlier period, which is not valid.

Even allowing for an exaggeration in the number connected with the trade ca.1643, however, it seems likely there existed many more pipemakers than those at present known. For example, a ca.1696 list of London pipemakers' guild members who swore allegiance to William III notes 44 masters and 229 journeymen, of whom 14 of the former and over 200 of the latter were hitherto unknown names (I am greatly indebted to R.H. Cooper (*in litt.* 29 February and 19 December 1972, 11 August and 2 October 1975) for supplying me with this information and a transcript of the document). The figures incidentally suggest the average master in London had about five journeymen; assuming he also had one or two apprentices one might suppose ca.300-400 individuals were directly involved in the trade. When the dependants of the masters and journeymen are added, the number of Londoners living on the proceeds of pipemaking at the end of the C17 would certainly be over 1,000. To this could be added those involved in supplying clay. Houghton (1693/4: 205) implies an average business at that time might have six hands, and this figure is noted in a 1757 notice advertising a pipemaking business for sale at Great Yarmouth (quoted in Oswald 1970b: 239). Certainly Oswald's recent figures (cf with those in Oswald 1959c: 202; cf also Oswald 1960a: 42) emphasize even more than his earlier ones that London was the centre of the industry in the first half of the C17. (The above two sections, dealing with the London pipe and pipeclay monopolies, have appeared in print in an earlier form in I. Walker 1972a.)

It has been stated (e.g. Fairholt 1859: Jewitt 1878: II, 456) that Winchester had a reputation for manufacturing superior-quality pipes at the beginning of the C17, for Ben Jonson in Act I scene iii of *The Alchemist*, which appeared in 1610, extols the merits of Winchester pipes. However, R.H. Cooper, who has studied the pipe-industry of this area for a number of years (*in litt.* 26 August 1968 with letter to *Hampshire Chronicle* 29 August 1964; and 8 October 1968) says he has found no evidence for pipemaking in Winchester before the mid-C17. He suggests the term "Winchester pipe" used by Jonson refers to pipes made in the low-class Liberty of the Clink, Southwark (where the Globe Theatre was), which came under jurisdiction of the Bishop of Winchester (see George 1925: 85, 1966 ed). Shakespeare, for instance, talks of the prostitutes of the area as Winchester geese (*Troilus and Cressida* Act V scene xi, noted in Mitchell and Leys 1958: 298, 1963 ed), and such an area might well have been a haven for pipemakers similar to East London (see 4: VI) - the Borough, Southwark, was certainly a pipemaking area by the beginning of the C19 (E.P. Thompson 1963: 869 n.3, 1968 ed; see also comments on Bristol pipemakers migrating there among other places in the later C18 in 6: V). Cooper points out that in 1610 there must have been few pipemakers outside London as tobacco was not plentiful at the beginning of the C17 and what there was was largely imported through London, that the Westminster guild's monopolies would have crippled any Winchester industry, that Poole clay sent to London for as little as 1s a ton by sea would have cost more when landed at Southampton and sent to Winchester by land, and that until the late C17 Winchester was a poor town.

As noted in 1: V, smuggling of tobacco was widespread enough to suggest the use of tobacco was widespread, though in view of its cost perhaps not as common as contemporary writers appear to imply. Further, the Winchester industry prior to ca.1650 could have lead a semi-clandestine existence as appears to have been the case with the Bristol industry, in which case neither records nor marked pipes would be frequent. However, as Cooper notes elsewhere (in litt. 29 July 1968), a few years before 1642 the Westminster guild despite its chequered career was able to visit Southampton to search for unlicenced pipemakers, which suggests any unauthorized Winchester pipemaking would have been on a small scale. This, and Shakespeare's allusion, do strengthen Cooper's belief that "Winchester pipes" were London made and that Winchester was not a pipemaking centre, for it is difficult to believe any high-quality industry there would have bowed to the Westminster monopoly without registering protests.

Unfortunately, the confusion is compounded by A. Dunhill (1924: 220) who says that Gauntlett pipes (noted below) were made in Winchester in the later C17, continuing the tradition of famous pipes already noted by Jonson. On this authority the story is repeated in the standard work on Jonson and his plays when commenting on the Winchester reference (Herford, P. Simpson, and E. Simpson 1950: 65), where as a final touch of confusion the source is noted as A.H. Dunhill in N&Q vol CLXXXII (1942) x - the reference is in fact on p.139 of that volume and is actually a repetition of the 1924 reference above in Dunhill sr's book.

In the second half of the century Bristol becomes the largest centre for exporting pipes, its pipemakers' guild being formed in 1652 (Latimer 1900: 239); and pipemakers are very common in the areas to the south and east of Bristol as well. Oswald suggests (1960a: 44, cf fig 17) this was the result of the withdrawing of London's tobacco monopoly and the growing of local tobacco in the area.

Another major centre at this time is Broseley (Oswald and James 1955a: 1955b) in Shropshire, where for a time a superbly-finished product and abundant coal (the use of wood being strongly discouraged by the government because of deforestation) and probably initially - until the early C18 in all likelihood - local clay (see 2: IX) overcame the disadvantages of an unrewarding geographical situation and resulted not only in trade in the Midlands, down the Severn valley, and in Wales, but in a considerable trade of pipes of Broseley bowl-forms in central England and in Wales presumably of general West Midlands manufacture. A few Broseley and Broseley-style pipes are also known from North America. (Distribution of Broseley and Broseley-style pipes in England and Wales and in North America is described in 6: VII(c).)

A third centre, smaller than Broseley - indeed famous for the products of a single family - was Amesbury in Wiltshire, ca.8 miles north of Salisbury, a place with even fewer geographical advantages than had Broseley. Pipes made by the Gauntlet(t) family there enjoyed a high reputation and a wide market - some held their pipes to be the best in England, and to judge by the astonishingly high prices they commanded and the fact that the Gauntletts, if not pipemakers to royalty, supplied at least a duke and a marquis, this reputation may not have been exaggerated (for the cost of Gauntlett pipes compared to others see 5: I). The family must have already been famous by 1640, for in 1641 or 1642 they supplied pipes to the first Marquis of Hertford (Morgan 1945: 20, 13) - who subsequently (in 1660) became second Duke of Somerset (*DNB* vol LI) - and in 1651 and 1652 Hugh Gauntlett, at the sign of the "Swan" at Amesbury, was supplying pipes to the Duke of Bedford (Atkinson 1965c: 95 n.11 citing *Life of a Noble Household*, accounts of the duke at Woburn Abbey and at his London house). A lease of 8 April 1675 notes a William Gauntlett of Netherhampton at the "Swan", holding "from the Earl [sic] of Hertford...a message, tenement, and the Swan Inn at Amesbury, together with the bailiwick of all the markets and fairs in Amesbury, including St. John's fair" (W.E. Brown 1959: 243).[2] This may have been a son of Hugh; Aubrey records a William Gauntlett of Netherhampton born at Amesbury. In any event he was clearly a man of some social position, and the connection with the Hertfords is interesting, suggesting this was how the Gauntlett pipes first attracted noble patronage.

There is other evidence to connect the Gauntlett family with Netherhampton, which is about two miles west of Salisbury: a John Gauntlett, "gentleman", held the tithe barn there in 1631 and there are monuments in the church there dating from 1672 until 1713 with the name. Netherhampton House may have been built by a member of the family later in the C17; the design on the wrought-iron gates there is supposed to be a lump of pipe-clay on an iron spike, the Gauntlett crest (W.E. Brown *loc. cit.*). In 1942 one J. Benett-Stanford noted (*N&Q* vol CXXXII 14 February 1942 p.96) that the family was extinct in Amesbury and represented only by a tenant of his living at Norton Bavant, ca.3 miles SW of Warminster and ca.15 miles west of Amesbury.

The family's trade-mark - a gauntlet on the pipe heel - was certainly widely plagiarized, one story being told of a maker who successfully claimed when sued for pirating the mark that he had altered the position of the thumb and that heraldically there was a valid difference between a hand dexter and sinister (quoted in E.T. Stevens 1876: 104-5 and W.E. Brown 1959: 243 from Thomas Fuller's *The History of the Worthies of England* of 1662) - however, if Atkinson's identification of genuine Gauntlett products (1971: 179-80, 178 fig 1,6 and 12 and pl XI,a) is correct, this story, though presumably contemporary (Fuller died in 1661), must be apocryphal, for Atkinson's genuine marks include both left and right hands. In all, Atkinson (1962e: 183-4; 1965c: 86, 88, 89 fig 1, rev ed 1969b; 1970c: 212-3, fig 4; 1971: 179-80, 185, 178 fig 1,6 and 12 and pl XI,a; 1973: 154) has classified at least 22 different stamps of this mark, some with various makers' initials, in the Amesbury and Salisbury areas as well as one from Basing in Hampshire and an obvious forgery from the Bristol area - this last is of interest, for certainly in 1710 Gauntlett pipes, whether actually carrying a gauntlet mark or not, were a specific type being made in Bristol, for a decision agreed to in that year among Bristol pipemakers to standardize lengths of various types of pipes specified that "Gantlett" (sic) would measure 11-1/2 ins "from the Heel in the direction of the Point" (p. 109 n.10) (entry in Bristol Pipemakers' Guild Book), a length which makes them among the shorter Bristol pipes of this period as the other types listed (see p.15 above) ranged from 8-1/2 ins up to 16 ins. Other plagiarizations are known from Winchester, Worcester, Broseley (cf R. Thursfield 1863: 79, pl IX), and London. A Dunhill (1924: 220) and presumably quoting from him his son A.H. Dunhill (N&Q vol CLXXXII 7 March 1942, p.139) claim the mark was imitated even in The Netherlands. By the end of the C17 another Amesbury pipemaker is known, Gabriel Bailey, who apart from producing orthodox pipes marked with his name is probably the maker of an unusually large bowl with a mark on the heel comprising a gauntlet with the letters G and B on either side inside a band with the circular inscription * AMSBVRY * PIPES and below this the date 1698 (E.T. Stevens 1876: 102 fig 36, 103; W.E. Brown 1959: 243, fig 4): it has been suggested (W.E. Brown 1959: 243; Atkinson 1971: 185, 180) that this is evidence that Bailey took over the Gauntlett business at this date, though as Brown notes, Bailey may have been a competitor rather than a successor of the Gauntletts. However, Atkinson observes that it is from ca.1700 that the majority of uses of the gauntlet mark with other makers' initials occur, presumably because the gauntlet was no longer being protected as a mark and thus presumably indicating that the Gauntlett family was no longer in business. How early the Gauntletts were making pipes is unknown; as noted above they were clearly renowned by the 1640s, but one of the earliest pipes known is one with a gauntlet heel-mark and a semi-illegible inscription scratched on the back and sides of the bowl seemingly referring to Queen Elizabeth which can be dated to ca.1600 or earlier and already has elements of the West Country chinned shape (Atkinson and Oswald 1969: 192, 193 fig 8,57), and another tiny bowl with a gauntlet mark and datable to ca.1600 has recently been recorded from London (Atkinson 1973: 154).

It is said the family used local clay from Chitterne, ca.10 miles west of Amesbury: if so, it is interesting that they could produce such sought-after products from a clay which, however conveniently located, cannot have been of a quality comparable to that from Poole. (Amesbury clay was still being used ca.1840, but for what purpose is unknown (W.E. Brown 1959: 244).) The traditional site of the Gauntlett factory in Amesbury is Sloanes Garage in the High St, but recent rebuilding of the garage (D.G. Hurst 1968: 114) failed to reveal any evidence. (For information not otherwise documented in the above three paragraphs see E.T. Stevens 1876: 101-8, also W.J.B. Smith 1869).

In the first half of the C18 the Bristol industry continues to expand rapidly, approaching London in number of recorded pipemakers, and Chester also expands (Oswald 1970b: 227). Kingston upon Hull has its most prosperous time during the C18 (Oswald: loc. cit.), perhaps in the earlier part (cf Sheppard 1902: 16-17, 1912 ed). The peak of the Marlborough industry was ca.1700 (Atkinson 1965c: 88, 94 rev ed 1969b), and at Salisbury (Atkinson 1971: 181) and Winchester (Atkinson in litt. 31 December 1971) the peak was in the earlier C18. At York (Anonymous 1954a: 1st page) the maximum number of makers recorded occurs during the second quarter of the C18. Fairholt (1859: 127-8) quotes a source indicating that Queen Anne's reign saw the height of smoking in England - it has been estimated that the per capita tobacco consumption at the beginning of the C18 was two lb or more a year (Rive 1926: 63; Penn 1901: 84-5), a figure not again reached until 1900 (see 1: VIII). Certainly by the second half of the C17 smoking appears to have been almost completely accepted socially, to judge by remarks of contemporary observers on, for example, smoking by the clergy (examples given in Dickson 1954: 157).

As the C18 progressed, however, there was a general decline in smoking (Trevelyan 1942: 390-1, 1946 ed; Oswald 1960a: 54), particularly among the more pretentious classes; and snuff, which appears to have been increasingly used in society after the Restoration in 1660, seems to have become quite general in Anne's reign when a taste was set by the capture of immense quantities in the Spanish ships taken at the battle of Vigo Bay in the first year of her reign, 1702 (A. Deane 1914: 3, 10; Corti 1930: 187-8, 1931 ed; Trevelyan 1942: 315, 1946 ed).

Beau Nash at the beginning of the C18 insisted that there be no smoking in the public rooms at Bath because it was disrespectful to the ladies (Trevelyan loc.cit.), no doubt contributing further to the decline of pipe-smoking in the respectable classes. In 1775 a man bemoaned not being allowed to have his pipe because his wife had social ambitions and that it was "ungenteel to smoke, where any ladies are in company" (quoted in Apperson 1914: 100). By the second half of the century Dr Johnson could record - apparently with some surprise - in 1773 that "Smoking has gone out" and William Cowper in 1782 puzzled (in verse) as to why snuff was so much in favour while pipe-smoking was taboo (both quoted in Apperson 1914: 119). Other contemporary references during the C18 indicate that while smoking was common enough in the middle and lower classes - clergy, country squires, merchants, tradesmen, and the rank and file - it was no longer fashionable for the upper classes and those aspiring to those classes (Apperson 1914: 90-1, chapts VII-VIII; A.H. Dunhill 1954: 106-7, 1961 ed; cf Mackenzie 1957: chapts 9-11). One contemporary of the period commented that smoking continued thanks largely to the army, the Universities, and the "simpler people who remain faithful to the pipe" (quoted in Anonymous n.d. [14]: 6th page).

This decline is reflected in the reduction of pipemakers recorded during this period (Oswald 1960a: 45, fig 18), and though these earlier numbers may have over-emphasized the picture (cf Oswald 1970b: 227, 228) there is no denying a country-wide fall in the pipemaking industry. After its zenith ca.1700 the Marlborough industry rapidly dwindled, there being only one maker there after ca.1730 and apparently none after ca.1750 (Atkinson 1965c: 88, 94, rev ed 1969b). At Salisbury (Atkinson 1971: 181) and Winchester (Atkinson in litt. 31 December 1971) too the pipemaking industry had declined by mid-century. The Broseley industry fell sharply in numbers of makers recorded (Oswald 1970b: 227) and the Bristol industry, which had been relying on its New World trade for its continued relative prosperity, was severely hit first by the Stamp Act troubles of 1765-66 and then by the American Revolution in 1775, resulting in the loss of the export trade there. In 1787 John Frederick Bryant jr, "late tobacco-pipe maker at Bristol", published some poetry and an account of his journeys of from 10 to 20 miles from Bristol as he tried to sell his pipes, chiefly to aid him in his poverty as the "tobacco-pipe trade [was] greatly on the decline". Bryant's father's business appears to have been prosperous until the Stamp Act troubles with the American colonies, when it was severely hit (Bryant 1787: vii-viii and passim; cf MacInnes 1939: 269-70) - this indicates that Bryant sr had been relying on the export market for his livelihood which in turn implies the home market was either unsought-after or indifferent.

The exception to this decline is Liverpool (see 4: II), where there is an increase in the number of pipemakers, due, Oswald suggests (1960a: 45), to the growth of that city at the expense of Chester as a result of the slave trade and privateering. Despite this general decline in smoking, Chester pipes in the late 1700s were esteemed by one source the best in Europe and were exported in great numbers, but by the early 1800s this trade had gone and only an attenuated home market remained (quoted in G.C. Spence 1942: 48-9).

The advent of the industrial revolution brought a revival to clay pipe manufacture, at least in the areas of growing industrialization and increasing working-class population. In the first half of the C19 pipemakers appear all over industrial England - the North-East, Lancashire, western Yorkshire, the Midlands, and the Home Counties, and also - curiously - in East Anglia and Lincolnshire (cf Oswald 1970b: 227). The decline of the Bristol industry towards the end of the C18 was, Oswald correctly suggests (1960a: 46; cf remarks above), due to the loss of the American trade. Bristol appears to have been the principal exporter of pipes at least to Virginia from ca.1660 until the end of the Colonial period, apparently making an "export only" model for the colonies in the C18 (I. Noël Hume 1963: 164), though at Williamsburg, Virginia's capital in the C18, Londoners did continue to have a large proportion of the trade (Atkinson and Oswald 1969: 205).

Smoking took a long time to regain social respectability following its decline in the C18. Not until the second half of the C19 did public smoking, whether out-of-doors or inside, begin to become respectable among the respectable classes, and pipe-smoking lagged behind cigar- and cigarette-smoking in this respect (Penn 1901: passim; Apperson 1914: chapts IX to XII; cf Trevelyan 1942: 391, 1946 ed and A.H. Dunhill 1954: 107, 1961 ed) - indeed there are exclusive restaurants which will permit cigars and cigarettes but not pipes (cf A.H. Dunhill 1954: 22, 21, 1961 ed). (Similarly in France, where it was not until the early C19 that pipe-smoking began to be socially respectable and spread beyond the working classes, pipes are forbidden in casinos and certain other public places (Herment 1954: 16-17, 17 n.4, 1965 ed).) As noted in 1: VII(e), smoking was considered a sinful indulgence by evangelicals of several religious persuasions in Victorian times, and to it was ascribed part of the poverty of the poorest classes. Thus in temperance novels and tracts, for example James Yeames's "Pot, Pipe, and Poverty, or, the three P's", the hapless poor are assailed by the abstainer-clergyman, when caught having a quiet drink and smoke, with the instruments of their folly and downfall in their hands (noted in Keating 1971: 41). This reinforces the evidence suggested above for the industrial revolultion and the rapidly-expanding working-class population restimulating a demand for clay pipes.

Finally, from the middle of the C19 the clay pipe, which, Oswald says, had been struggling against competition from meerschaum pipes and the cheroot holder (some of which were made of pipeclay - one is in the W.D. and H.O. Wills Collection and a similar type was listed in a catalogue of Wm Southorn and Co. of Broseley probably dating to the beginning of this century), received what was to be its death-blow, albeit not without a prolonged and bitter struggle, from the newly-introduced brier pipe (Oswald 1960a: 46; 1970c: 228).

The clay pipe, however, held out well into the C20, generally in industrial centres but also in rural areas. The last Bath maker closed in 1919 (Brown and Brown 1974: 27), the last Bristol maker closed in 1921 (Pritchard 1923: 190); the last Nottingham maker at the beginning of the 1920s (Alvey 1973: 35); the last Lincolnshire maker worked in Grantham up to ca.1927 (P.K. Wells 1972: 13, 15); the last York maker into the 1920s or 1930s;[3] the last Cheshire maker closed in 1927 (G.C. Spence 1942: 56), though the firm was still selling stock when Spence was writing; the last in Gateshead in the late 1930s (Parsons 1964: 240, 250; cf Oxberry 1937: 64-6); the last in Edinburgh ca.1942 (Anonymous 1964b), though it continued to make pipeclay blocks for doorstep-whitening until 1962; the last in Portsmouth after WW II (C. Green 1973a); the last in Sunderland apparently in 1953 (Parsons 1964: 240-1, 250); the last in Leeds in 1953 (Anonymous n.d.[2]: no pagination); the last two at Rainford in Lancashire in 1956 (Berry 1963: 8); and the last in Glasgow in 1967 (Walker and Walker 1969). Glasgow, indeed, was perhaps one of the last bastions of the trade, for as late as 1950 there were three firms in business. According to A. Dunhill (1924: 219-20), manufacture at Broseley ceased "a few years" before he was writing, but in fact the famous Southorn family continued to manufacture occasionally up to ca.1962 (cf Oswald and James 1955b: 225; Oswald 1960a: 95) - indeed, the family was still talking in 1968 of the possibility of going back into the business (and now has-see p. 14 n.7). A member of a London and SE England family of pipemakers, W. Swinyard, was producing pipes until 1926 at Aldershot for the troops (Atkinson 1964a: 76-78, 81 n.9); production for servicemen no doubt contributed to the longevity of the last Portsmouth firm which as noted above did not close until after WW II, for the firm, Leigh and Co of Portchester, were at one time contractors for pipes to Portsmouth Dockyard (C. Green 1973a). The last London maker recorded is Edward Back who last appears in London trade directories in 1944 - his business went back through different owners into the early C19.

While this writer was in Britain (1967-69) the only pipemaking firm still in business there after McDougall's closed was John Pollock and Co. of Manchester, who were then producing ca.250,000 pipes a year (a 1964 source says ca.350,000 (Anonymous 1964a) but this is probably incorrect) and took over some of McDougall's equipment on their closure (Walker and Walker 1969: 146).[4] In tneir last years McDougall's were still exporting to Canada, the

United States, the West Indies, and West Africa and were using between 30 and 40 moulds to produce the types of pipes preferred in various local areas at home, for example Glasgow, Edinburgh, Aberdeenshire, Ireland (Walker and Walker 1969: 145-6; Rodger in litt. 24 July 1969). In this continued use of different moulds to suit local tastes, McDougall's were carrying on a long tradition, for a 1799 advertisement among the pages of the Bristol Pipemakers' Guild Book lists variously-priced kinds of pipes, some "suitable for the different West-India markets", some "suitable for the different American markets", and some "suitable for the Irish and Spanish markets", indicating differing types of pipes were being made for different markets and indeed for various areas within the same market. Earlier still, the production in Bristol from the end of the C17 into the earlier C18 of heelless "export only" bowls (see above) indicates the same recognition of different tastes in style. Pollock's also export widely, their pipes going to Belgium, Sweden, Canada, the United States, and Australia (J. Peterson 1968: 14). The traditional export trade in pipes, which is almost as old as the industry itself, thus continues.

SECTION II:
THE NETHERLANDS

The earliest known reference to the use of tobacco in The Netherlands is in a decree of the town of Enkhuizen in February 1580 when its sale, along with that of beer, wine, and brandy, was forbidden on a forthcoming feastday (Brongers 1964b: 21-22). Smoking is not specifically mentioned, and the tobacco could have been for chewing, but smoking in some form was certainly known in England well before that date (see preceding section) and in the Rhineland by 1587 (Corti 1930: 100, 1931 ed; Brongers 1964b: 19-20). In 1598 a Dutchman, Emanuel van Meeteren, wrote of the popularity of smoking in Europe, especially England, and noted silver and earthenware pipes (Brongers 1964b: 17). By 1610 tobacco was one of the principal imports of The Netherlands (Anonymous 1960: 81) and by 1615 it was being grown on a large scale in the province of Utrecht. In the following decades its cultivation spread widely in The Netherlands (Brongers 1964b: 71).

The first three decades of the C17 saw the beginning of pipemaking in a number of centres in The Netherlands, modern Belgium, and northern Germany (except where otherwise noted, this section on Dutch pipemaking is based on Helbers and Goedewaagen 1942). The industry was brought from England by people leaving because of increasing religious dissatisfaction following James I's coming to the throne in 1603, and by English soldiers of fortune in the armies in the Low Countries at that time. The earliest-known reference to a pipemaker in The Netherlands is in 1611 when an English pipemaker in Amsterdam took legal action against another pipemaker (Brongers 1964b: 31-2). The first well-known Gouda pipemaker and the generally-accepted father of the Gouda industry was another Englishman, William Baernelts, who commenced business in 1617: before Baernelts's death in 1625 other Englishmen had set up business in Gouda and were attempting to plagiarize his mark. Another Englishman obtained a monopoly for supplying clay for pipemaking in 1627. In the early C17 in Gouda it is noticeable from wills that pipemakers were often middle-class and generally had several premises. (Hendrickx (1963: 154) lists several of the English pipemakers in Gouda at this time and gives slightly more detail on this period of the Gouda industry than do Helbers and Goedewaagen.) English pipemakers remained predominant at Gouda until 1637 but in 1641 Dutch makers there, now in a majority, tried unsuccessfully to form a guild which would exclude the English. It can thus be seen why English-derived technical terms occur in the Dutch industry.

As a result of this agitation in 1641, the Municipality of Gouda drew up certain rules, one of which attempted to deal with the perennial problem of plagiarizing makers' marks. Dutch makers' marks were either symbols, letters, or numbers, the latter two cases usually crowned. The letters were the makers' initials only in extremely rare cases, unlike the English makers' marks which almost invariably comprised the makers' initials. It seems that the Dutch use of symbols comes from the earliest English pipemakers who are known to have used such marks; the idea died out in

England early, but not before the emigrant English pipemakers had taken the idea to The Netherlands in the early C17. In 1660 the Gouda Pipemakers' Guild was formed and thereafter kept a comprehensive list of makers' marks and evolved complex rules regarding their disposal by being sold, willed, or in other ways, as well as regulations on all the myriad minutiae of the entire industry from which pipes were to be decorated to what was to be paid the bargees for transporting the finished articles. Gouda seems to have become the major Dutch pipemaking centre almost immediately, attracting by far the largest number of pipemakers. It had since medieval times been the centre of a pottery industry, and ca.1620 there were still 30 potteries in the city.

In 1665 there were 80 members of the Gouda Pipemakers' Guild; in 1679, 161; and by 1750, 374. At that time it was estimated that 7,000 of Gouda's population of 20,000 were directly connected with the industry. However, in the 1750s the city's trade, which was primarily geared to an export market which extended to Denmark-Norway (Pettersen and Alsvik 1944: 10; Kristensen 1959: 86, 87; cf Friederich 1964a: 10), Sweden (Puktörne 1968; 68-74, figs 2 and 4), Russia (Helbers and Goedewaagen 1942: 18), Poland (Żurowski 1949: 41 fig 35, 51 fig 41, 28-31; Rutkowska and Żaryn 1955: pls 37-38), West Africa (Nunoo 1957: 16-17, pl III btm, additional information Oswald *in litt.* 1 January 1969 and Nunoo ditto 23 May 1969; Calvocoressi 1968: 18, 17; 1969: 7; MS), the East Indies (Helbers and Goedewaagen *loc. cit.*),[5] the West Indies (unpublished material from H.G. Omwake dated 1966; Clerc *in litt.* 10 November 1967; Oswald 1968; 1969), and North America (e.g. I. Walker 1971c: *passim* and refs), was hit first in the 1740s by restrictions and then in 1747 by the ban on imported pipes by Sweden (Puktörne 1968: 72-3, 69 table 1), then by various admittedly short-lived attempts between 1749 and 1768 to ban or restrict by duties the importation of pipes in various parts of Denmark (Kristensen 1959: 88), by increased duties in 1753 and a ban on imported pipes in 1759 in Norway (Pettersen and Alsvik 1944: 12, 16, 18, 20, 22, 42); and then severely hit by parallel events in Prussia, where a duty was levied on imported pipes in 1754 and shortly afterwards they were banned entirely.

In England the importation of foreign pipes was forbidden under the terms of the Westminster pipemakers' guild charters of 1619 and 1634 and the London and Westminster pipemakers' guild charter of 1663, but Dutch pipes were being legally imported before the end of the C17 (Houghton 1695/6: 1st page; repeated in Jewitt 1878: I, 293) - there was a tax on them between 1696 and 1698 (see 5: 1) - and into the first two decades of the C18 (Sheppard 1902: 4-5, 1912 ed). To judge by the quantity of Dutch pipes found recently at Plymouth dating to the period ca.1630-70 and particularly to the first half of the century (Oswald 1970a: *passim*; 1970b: 230), and to Dutch pipes of the same period from Kingston upon Hull (Oswald 1970b: 230-1; cf Sheppard 1902: 16, 1912 ed) and Dutch influence on pipes from Edinburgh (see p. 347 below) and perhaps Ipswich (Oswald 1970b: 231) the superior Dutch products were being obtained illegally before that. A 1719 reference, however, indicates that the import of Dutch pipes into England was forbidden but that trading companies had been allowed to go to The Netherlands to pick up Dutch pipes for the slave trade as Dutch pipes were cheaper than English ones (noted in Donnan (ed) 1931: 241-2); and in the unpublished Gouda guild records there is a reference in 1789 to England having completely forbidden the import of Dutch pipes - certainly in C18 Williamsburg in Virginia the only time Dutch pipes appear is during the American Revolution (1775-83), at which time there was French support for the revolting colonies and disrupted trade with Great Britain (noted in paper "James Geddy and Sons, Colonial Craftsmen: An Exercise in Historical Archaeology" given by I. Noël Hume at the Spring 1968 Society for Post-Medieval Archaeology Conference at Cardiff; cf I. Noël Hume 1970c: 307).

These bans had widespread effects: the unpublished Gouda pipemakers' guild records noted in the late 1780s that it had prevented the sale of pipes in Brandenburg and Silesia (the latter now part of Poland) and also the shipping of pipes through Prussian territory to Lausitz and other areas. The Prussian restrictions were to protect the new pipe industries at Stettin (Szczecin) and Königsberg (Kaliningrad); at the same time the pipe industry at Höhr in the Westerwald near Coblenz was expanding, and this caused perhaps the biggest inroads in the Gouda industry, as the same documents indicate. Further, from the early C18 onwards the famous German porcelain pipe-bowls were being produced, these being among the first items made at Meissen and appearing there as early as 1710 (see following section).

Elsewhere, Dutch exports declined as German pipes, of lesser quality but lower-priced because they were produced in an area with a lower cost of living, took their place: ca.1760, 20,000 gross Gouda pipes were being exported annually to Norway, but by 1789 the trade, no doubt also affected by the efforts to start a native Norwegian industry (see below), was virtually dead. About 1765 ten boatloads of pipes were sent annually to Hamburg from Gouda; in 1789 only three were sent.

Other examples of the sort of problems Gouda pipemakers were faced with as more and more tariffs were raised against them are given in the unpublished guild records. A few years before 1785 an individual who was not a citizen of Gouda learned pipemaking there and then went to Antwerp where he set up business. As a result not only Antwerp but the whole of Brabant had levied such a tax on imported Gouda pipes that it was no longer possible to trade with that area. Again, ca.1775 a pipe-factory was being established in Utrecht and the people concerned came to Gouda and attempted to smuggle out sacks of Gouda pipemaking tools. There was in fact a guild rule in Gouda, approved by the City Fathers in 1750, that non-citizens should not be shown pipemaking tools or even be told about them. When Dunkirk bribed some Gouda workers to work there in 1749 at a time when Gouda trade was slack, the City Fathers called them back with an offer of 25 guilders and an assurance that they would be given priority in obtaining work. In 1758 the Gouda guild, hearing that a journeyman pipemaker, one Cornelis de Wilde, had gone to Bremen and had been hired there as a pipemaker and was attempting to obtain Gouda pipemaking equipment, warned him that unless he returned immediately to Gouda he would be forbidden to live again in Gouda and that his wife, if she followed him to Bremen, would also be forbidden re-entry. These examples give some idea of the tradition built up by the Gouda pipemaking industry, as well as the problems faced by a declining specialist trade.

The basic reason for the decline of the Gouda industry appears to have been the rise during the second half of the C18 of lower-priced German pipe-production. The unpublished records of the Gouda pipemakers' guild indicate that in the late 1780s - the time when Helbers and Goedewaagen note that Gouda trade to Norway was virtually non-existent - the northern trade, which presumably means Scandinavia and the Baltic, was very profitable for the long-stemmed and best-quality pipes but the market was made difficult for Gouda makers because Rhineland and Stettin pipemakers were cornering it with cheaper pipes, some of them plagiarizing Gouda marks (particularly the famous Het Lam onder den Boom - the Lamb under the Tree - whose then owner specialized in the northern trade). It is thus clear that with the decline of the native Scandinavian industries a market there for foreign pipes again arose, but by the end of the C18 it had been taken over from Gouda by more competitive German industries which had only just been starting in the middle of the century when the native Scandinavian industries had been set up under the protection of high tariffs and outright prohibitions.

About 1740, there were 29 kilns in Gouda, in 1789 there were 17, and in 1806, 11. Pipe production for 1805 was two-thirds less than for 1750. The 374 makers ca.1750 had fallen to just over 280 by ca.1771, and to 130 by 1805. As late as ca.1771 several makers still employed 60 to 70 workers, giving some indication of the size the industry must have been in its prime. From this remark it is evident that "pipemakers" registered by the Gouda guild were the factory owners, and not the rank-and-file makers, and from what Duhamel du Monceau describes of the production methods it is clear that pipemaking was a real industry, similar to that in C19 Britain, and not at all like the "cottage industries" of the English C17 and C18 pipemakers.

The Naploeonic occupation of The Netherlands in 1795 was a major blow. In 1798 the French government imposed a tax on Gouda pipes sold west of the Rhine which more than doubled their price (Gouda guild records), and the guild was officially dissolved the same year on the grounds that it was a restrictive organization. However, "Commissioners for the Pipe Industry and its Factories" continued, and in 1806 they were petitioning to have the 1798 tax repealed. In 1826 the same Commission petitioned the king to see that a decree of 1818 against the perennial problem of Gouda marks being plagiarized in other pipemaking centres was being adhered to, that the Nederlandse Handels Maatschappij (Netherlands Trading Company) be asked to place orders for pipes with Gouda makers, and that the Prussian prohibitions of some 70 years previously (see above) which prevented Gouda pipes being shipped to eastern Europe be lifted.

In particular the Commission noted that they were losing their wide foreign trade to places such as France, Spain, Portugal, the Mediterranean area, Asia, Batavia and Sumatra in the Dutch East Indies, North and South America (Charleston and Rio de Janeiro are mentioned) and especially the Dutch colonies there. Cigars, which had been, they said, "in general use for a long time" and "a foreign type of pipe" (German porcelain pipes?) were also noted as affecting the Gouda pipe market. (According to Brongers (1964b: 219-20; also in Anonymous 1951: 113) the cigar other than as a curiosity did not appear in The Netherlands until the end of the C18, but became popular during the first half of the C19. The first Dutch cigar-factory was opened in 1826 (Brongers 1964b: 220).) The Commission cite the high praise given to their products the previous year at an exhibition at Haarlem and how superior their pipes were held to be over

English exhibits as proof that the old skill was still there. A smoker, it was averred, would break three of other makes of pipe to one of a Gouda pipe, and Gouda pipes could be refired to clean them three or four times as often, as other pipes (Gouda guild records).

Subsequently a pipemakers' union was started, in 1855, and once more set itself to problems of registering marks and keeping them distinct from one another. It continued to exist until 28 November 1911, when, moribund, it was dissolved. (The preceding paragraphs are based on Duhamel du Monceau 1771: 6; Helbers and Goedewaagen 1942: 14-15, 17, 18-19, 48; Fresco-Corbu 1963: 424-5, and Brongers 1964b: 31-6 except where otherwise noted.)

Gouda pipes came in three classes - ordinary, fine, and porcelain - and in 1739 and 1740 Gouda pipemakers were permitted to put distinguishing marks on these classes. Unfortunately there is confusion as to which marks indicated which classes. In one place (p.18) Helbers and Goedewaagen say that in November 1739 permission was given for pipemakers to differentiate the *porcelain* class from the others by adding the Gouda coat of arms to the bowl beside the maker's mark to prevent merchants mixing inferior pipes with those of the best class. However, sales of *fine* pipes dropped so much because buyers thought they (being unmarked) were *ordinary* pipes (also unmarked) that on 4 March 1740 permission was given to mark *fine* and *ordinary* pipes with the arms, surmounted by the letter S (Dutch *slegte* - ordinary)[6] on both sides of the bowl. Elsewhere, however, (p.48), it is stated that *fine* pipes were to have the single arms and the letter S for *ordinary* pipes, porcelain pipes presumably being left unmarked. The differences can be presented as follows:

Porcelain	single coat of arms (1739)	no mark
Fine	double coat of arms, each surmounted by the letter S (1740)	single coat of arms (1739)
Ordinary	as *fine* class	double coat of arms, each surmounted by the letter S (1740)

The confusion may lie in the wording of the original documents permitting the use of these marks, for among the unpublished Gouda guild material translated in Ottawa is a reference ca.1790 to these decrees, and the first one (dated 26 November 1739) talks of "fine porcelain pipes" while the second one talks of "ordinary fine" pipes, suggesting two rather than three classes of pipes. (For illustrations of these marks see I. Walker 1971c: figs 5b and 10.)

Whatever the precise meaning of these marks, they indicate that pipes thus marked cannot be earlier than 1739-40 - this has proved useful at C18 sites such as Louisbourg (I. Walker *op. cit.*) where the main occupation was ca.1720-60, and at Varberg fortress in Sweden (Puktörne 1968: 72-3) where four identical Dutch bowls could be dated to between 1739-40 and 1747 when Sweden banned the import of foreign pipes.) As these marks were put only on certain classes of pipes, their absence cannot be taken to prove a pre-1739-40 date for pipes not so marked, and indeed it appears the use of these marks must have been abandoned some time subsequently - perhaps during the French occupation of The Netherlands at the turn of the C18 - for in 1814 it is noted that the 1739 and 1740 regulations were reinstituted (Helbers and Goedewaagen 1942: 52). However, these marks do offer a very useful dating horizon when found on material in archaeological contexts.

From shapes deriving from English pipes at the beginning of the C17 Dutch pipes gradually evolved in their own way. The only attempt to establish a typology of Dutch pipes has been that of Friederich (1964a-d; 1970). His dating system is a statistical method involving multiplying various measurements taken from the bowl and equating the resulting figure to a dated graph (see 1: II(b)). Although it is far from clearly explained, this system may have some validity (some preliminary work by this writer and Miss E.A. Wylie of the National Historic Parks and Sites Branch in Ottawa suggests that at least with English pipe-bowls there are certain broadly-measurable trends) and in several instances this writer has been able to date Dutch material from stratified deposits and to find general agreement with Friederich's dates, but until the system has been proved by comparison with archaeologically-dated pipe material - Friederich makes no mention of having done this - it cannot be accepted without reserve. However, a useful guide in English, giving a typology of the major types of Dutch pipes based on Friederich's work, together with a collection of makers' marks on Dutch pipes found in England, has been published by Atkinson (1972d).

As can be seen from Oswald's English pipe typology, there appears ca.1680 a quite different type - his type 9. This type is generally ascribed to the influence on traditional English pipe styles of the Dutch pipes brought over by followers of William of Orange in 1688 (1: II(a)). Although this explanation was put forward at least as early as 1852 it is not clear which Dutch form would have been the prototype. Omwake (1965b: 13) describes it as having a large heelless, straight-sided and cone-shaped bowl set on the stem at an angle only a little more than 100° and with the plane of the top of the bowl parallel to the line of the stem. Omwake did not illustrate the pipes he had in mind, but presumably he was referring to a distinctive pipe usually carrying the characteristic Dutch style of maker's mark which has been found on sites in New York state in contexts within the known Dutch area of influence in the C17, including at Fort Orange on the site of present-day Albany where the Dutch occupation was 1624-75 (Hagerty *in litt.* 6 January 1969 and paper "Trade Pipes" given at the Spring 1970 Symposium of the Council for Northeast Historical Archaeology, Bear Mountain, New York state; McCashion *in litt.* 11 September and 9 November 1971 and paper "Pipe Dreams: the Dutch and their Elusive Pipes" given at the Spring 1972 Symposium of the Council for Northeast Historical Archaeology, Bear Mountain), and have also been recovered from the wreck of the Dutch East Indiaman the *Slot ter Hooge* which sank off the Madeira Islands in 1724 while en route to Batavia (Djakarta) by way of the Cape (Sténuit 1975: 274-5 illus., item 13). An example of this bowl form is illustrated in FIG 121, and follows Omwake's description except that the plane of the bowl rim is not parallel to the stem.

Comparisons to English type 7 bowls, which as noted in 1: II(a) have been suggested as showing Dutch influence as well as type 9, are not really close, though as the type 7 style of parallel- or roughly parallel-sided bowls does appear as a new form in England ca.1660 with no known native antecedents some outside influence might be postulated. The form shown in FIG 121 is not a shape illustrated in any survey of Dutch pipe material known to this writer, but according to McCashion (in litt. 26 August 1973), Friederich has noted a bowl of this shape found in the Amsterdam area which he (Friederich) dates to ca.1690. It is possible that this bowl form is an "export only" shape and relatively rare in The Netherlands - studies of Dutch pipes in The Netherlands, especially excavated material, are not as far advanced as is research on English material or material from colonial North America.[7]

Moreover, this writer has discovered in contexts of the first third of the C18 at the French fortress at Louisbourg, Nova Scotia, another apparently hitherto unrecorded shape of Dutch pipe (FIG 122) which typologically is a more convincing prototype for the English type 9 series (I. Walker 1971c: 111, 113 fig 44). As can be seen, it has the plane of its bowl rim parallel to the line of the stem, and this is an extremely unusual feature on Dutch pipes. As Friederich's illustrations show, the marked angle of the bowl rim to the line of the stem was one of the most characteristic features of Dutch pipes, and one which tended to become more extreme with time, continuing at least until the end of the C19 (cf Brongers 1964b: 79). In view of this conservatism, it has been postulated by this writer that the type illustrated in FIG 122 failed to find a lasting market in The Netherlands, but appearing first in the 1680s did affect English pipe shapes profoundly. However, in anticipation it may be noted here that as a result of his Bristol research this writer has found what he believes is a more plausible origin for Oswald's type 9 bowls without invoking foreign influence (see 6: VII(a)(2)).

At present there are only two Dutch pipemaking firms in The Netherlands - those of Goedewaagen (Koninklijke Hollandse Pijpen en Aardwerkfabriek), whose family appears to have been in the pipemaking business since 1779 (Helbers and Goedewaagen 1942: 156), and Van der Want (Zenith Plateelbakkerij en Pijpenfabriek), whose family has manufactured pipes since 1749 (Tempelman and Roest 1967). Both these firms are in Gouda, and both now also produce pottery, as their names show. Goedewaagen produces earthenware and Van der Want, delftware. The Van der Want pipe-manufacturing process is described in 2: II, also in I. Walker 1971b.

Both firms still export pipes: Goedewaagen pipes were being sold at Mystic Seaport, Connecticut in 1964 (I. Walker 1966c), and are at present used, albeit incongruously, by the Fortress of Louisbourg in its mid-C18 restoration of that site in Nova Scotia (e.g. fig 5 of back page of National Historic Parks News 2, February 1970); while Van der Want pipes could be purchased in Toronto in 1965 and a mould at the firm's factory seen during the writer's visit there in 1969 was for pipes with an Indian's head for the bowl and WILLIAMSBURG on the stem, presumably for sale at that restoration.

SECTION III:
GERMANY

In Germany, tobacco was introduced by Spanish soldiers as early as the reign of the emperor Charles V, 1519-56 (quoted in MacInnes 1926: 20). Smoking was known in the Rhineland by 1587 (Corti 1930: 100, 1931 ed) - though perhaps of primitive cigars, not pipes, as it is Spanish soldiers who are mentioned - and in Hamburg by the end of the C16 (Laufer 1924b: 58). However, two German travellers in England at the end of the C16, Paul Hentzner in 1598 and Thomas Platter the younger in 1599, describe smoking in terms which suggest they at any rate were unfamiliar with the habit at that time (Dickson 1954: 194-6). Pritchett (1890: 12-13), though he can hardly be considered a scholarly source, illustrates a German woodcut dated 1616 depicting a large long-stemmed pipe being smoked. Pipes were being made in Cologne - apparently by refugee Englishmen - by 1628, according to Brongers (1964b: 35; cf Schmitt 1957: 159) and pipemaking there was condemned by imperial decree in 1649 (Corti 1930: 110-1, 1931 ed). Cologne had been a pottery centre, manufacturing salt-glazed stoneware, from the C15 (Reineking-von Bolk (ed) 1971: 35) and was in the C18 to become a major centre of the tobacco and snuff trade (Corti 1930: 188, 1931 ed).

The origins of the German pipemaking industry are obscure, but it appears to have started about the same time and for the same reasons as did the industry in The Netherlands. By the middle of the C17 pipe-smoking amongst the working classes in Germany was universal, having been spread by Dutch and English mercenaries during the Thirty Years' War, 1618-48. (Laufer (1924b: 58) says that the early German *Toback* and the dialect *Tuback* for tobacco and the Low German *smoken* for to smoke show this English influence; but he appears to be in error here, for the spellings for the word for tobacco - the modern German is *Tabak* - presumably represent the general spread of the plant and its use in German-speaking areas without any specific implication of English assistance, while *smoken* must be regarded as the Low German (and also Dutch) cognate of the modern German *schmauchen* to smoke, a word noted occuring as early as 1253 in the Grimm brothers' *Deutches Worterbuch* and therefore of good Germanic origins.) Sprengel, writing in the mid-C18 and referring to pipemaking in Brandenburg, says that the technical terms used probably came from The Netherlands as the trade spread from there to Cologne and thence to Brandenburg (Sprengel 1772: 289-90); some of the technical terms which he records (see 2: IV) are certainly Dutch in origin. Hendrickx, who annoyingly does not cite his sources but seems to have access to material at present unknown to this writer, indicates (1963: 157) that Cologne, already a pottery centre, soon became an important pipe centre as pipemaking spread up the Rhine from The Netherlands; later (p.158), Hendrickx indicates the stoneware centre of Raeren, west of Cologne and now just inside Belgium, had also been an early pipemaking centre. The industry at Höhr and Grenzhausen in the Westerwald he implies started with this same spread of pipemaking, as did the industry at Grossalmerode near Cassel in northern Hesse, in central Germany, some 90 miles NW of the Westerwald.

However, it was not until the beginning of the C18 that Frederick I of Prussia, 1701-14, made smoking socially respectable with his smoking parties. His pipes came either from The Netherlands or Cologne. Frederick's son, Frederick William I, 1714-40, was much less formal and used - sometimes at least - the lower-class, short-stemmed, Dutch pipes (Corti 1930: 188-94, figs 42 and 44, 1931 ed; Heimann 1960: 63 and illus.; Hendrickx 1963: 158).

As already noted, Prussia placed a tax on imported pipes in 1754 and shortly afterwards forbade the importation of any pipes. This boosted German pipe manufacture and the new industries at Stettin and Konigsberg at the expense of Dutch pipes, and probably as a result of this, pipe manufacture in Germany spread. According to Sprengel (1772: 301-2), whose knowledge may not be entirely accurate and appears to be restricted to the Brandenburg area, and who gives this particular information in an addition to his article at the end, the first clay pipe factory in Berlin was established in 1753 by a sculptor named Glume and the second in 1755 by a merchant named Raue - he notes this latter individual had recently died. At this time there were two other pipe-factories in this area of Germany, one near Frankfurt-an-der-Oder and the other on a manorial estate in Altmark, immediately west of the Elbe; and also a number of makers in small towns in Brandenburg all of whom, however, made short clay pipes. At least in the four factories noted the clay was obtained from the Magdeburg area. However, there is a reference as early as 1634 to a Scarborough vessel, the Delight, taking "15 loads Tobacco pipe earth" from Boston to Danzig (Boston port books, reference in P.K. Wells files), which suggests the possibility of early clay pipe manufacture in Central Europe.

In 1784 a factory was founded at Hubertusburg, between Meissen and Leipzig, which turned out pipes said to be almost as good as English ones (and therefore presumably "clay" pipes - that is the white ball-clay pipes, as opposed to porcelain pipes). Other factories were established at Gotha, farther west (H.E. Smith 1860: 212, quoting Marryat's History of Pottery and Porcelain p.122). (Hendrickx (1963: 158) appears to have a different version of this information, saying that in 1784 a Count Marcolini erected a factory at "Hurtertsberg" for manufacturing porcelain pipes and that another appeared at Gotha at a later date - in fact, according to Honey (1952: 318), a faience-factory was founded at Hubertusburg in 1770 and this subsequently did come under the direction of Count Marcolini, the Elector of Saxony's minister responsible 1774-1814 for the Meissen porcelain factory). That conventional clay pipes were still being made at Gotha in the second half of the C19 is suggested by an imitation of a Peter Dorni-style pipe (see p. 296 below) with I.G. PRENSE and IN GOTHA on it from a site near Albany, New York state (McCashion in litt. 9 November 1971; seen by writer April 1973), suggesting a Gotha maker was pirating the products of J. and G. Prince of Gouda who ironically were plagiarizing Dorni's products.

In the late 1780s the unpublished records of the Gouda pipemakers' guild translated in Ottawa indicate that Cologne was still manufacturng clay pipes, and was complaining about taxes levied in The Netherlands on pipes shipped down the Rhine and destined for Denmark and Holstein (as is noted below, a Cologne-marked pipe is recorded from an American site of the 1850s and 1860s, presumably indicating that the industry was still alive there then). The same documents also note that in the late 1780s the Stettin industry was especially noted for supplying pipes to Hamburg, Holstein, Denmark, Mecklenburg, the whole Baltic area, and as far away as Russia, and in doing so was plagiarizing Gouda marks, particularly the famous Het Lam onder den Boom (The Lamb under the Tree), whose then owner specialized in top-quality pipes and supplied these areas (see preceding section). At this time and indeed as early as 1766 the Elector of Trier was also complaining about taxes levied on pipes on transit down the Rhine from his domain - as the Electorate of Trier included Coblenz, Andernach, and part of the Westerwald, the pipes were probably from these centres (see below). Gouda pipemakers claimed that these makers, those in Stettin, and others in "the North", were plagiarizing Gouda marks.

Pipemaking is one of the trades recorded in 1811 in Hildesheim, SE of Hanover (Kaufold 1968: 18-20), and Sprengel writing some 40 years earlier noted (1772: 290) that there were pipeclay deposits at Hildesheim.

As noted earlier, Hendrickx notes the early appearance of pipemaking in the Cassel region of central Germany. He also notes, again with no reference, that in 1775 a certain Nolde (no first name given) who was a pipemaker at Münden near Cassel made a "special kiln" the design of which he kept secret, but that jealous competitors broke it open to see how it was constructed and that as a result pipe-manufacture spread elsewhere in Münden and to Uslar, Holzminden, and Hameln (Hamelin), all to the north and farther down the Weser (Hendrickx 1963: 157).

Porcelain bowls, which became the traditional German manner of smoking, have been discussed earlier (see 1: VII(g)). They appear to have been first produced at Meissen, with the first successful production of true porcelain in Europe there ca.1709-10. The traditional porcelain bowl shape derives from the "capless acorn" form of Dutch bowl which appears to have evolved in The Netherlands at the end of the C17 and became the basic Dutch bowl form until at least the later C19. By the 1870s porcelain bowls could be called "the favourite of the German peasant" suggesting they were probably the standard lower-class form of pipe in Germany.

One of the centres benefiting from the restrictions placed on Dutch pipes by the Prussians was Höhr - now Höhr-Grenzhausen - near Coblenz, in the Westerwald. This area had been famous from the early C17 for its salt-glazed stoneware, Höhr being settled ca.1590 by refugee potters from Seigburg, and nearby Grenzhausen slightly earlier by potters from Raeren, Seigburg and Raeren being two famous late-medieval pottery centres in the Cologne-Aachen area farther north affected by the prolonged warfare from 1581 in the Rhineland (Klein 1955: 25-6; I. Noël Hume 1958; 1967; Reineking-von Bock (ed) 1971: 44; Thwaite 1973: 258). In the C18, however, the Westerwald stoneware industry was declining (Solon 1892: II, 86-92; Cox 1944: I, 414-8; Penkala 1951a: 326), and it is perhaps for this reason that the pipemaking industry expands. According to Dienemann and Burre (1928: 194) the pottery industry of the area goes back to Roman and possibly prehistoric times, and clay pipe manufacture started following the dislocations of the Thirty Years' War, which ended in 1848 (cf Schmitt 1957: 157).

It was from here that the pipemaking industry reached Andenne in Belgium. According to Javaux (1935: 10-16) the earliest pipemaker at Andenne was a Peter Hurter from Höhr who settled there in 1768 and whose family continued in the business until 1929. Javaux identified many of the terms used in the trade at Andenne (described in the chapter on pipemaking) with words used by the German pipemakers at Höhr - rolle (*Rolle* in German), *schinque* (*der Schenker* in German), *schmoud* and *schmoudrage* (*schmoudern* in German), *schtoup* (*der Stöpfer*), and *trameuse* (*die Trümmerin*) for example. These terms Javaux also found used at Mons and at Chokier, near Liège - at Chokier the first pipemaker was again a native of Höhr who arrived in 1818.

However, Javaux's finding of these words at Höhr does not necessarily mean they are originally German. In fact all the terms noted by Javaux are almost certainly of Dutch and ultimately English origin. Further, though the technique of hand-production in the Westerwald is now almost dead, rolls were made by using both hands on the one piece of clay, as is done in The Netherlands to the present day. Again, the manufacturers of German descent at Andenne used makers' marks which included (Javaux 1935: 12, 13) numbers surmounted by a crown, a very distinctive type of Dutch mark (Helbers and Goedewaagen 1942: *passim*), though it is possible that this is no more than confirmation that Höhr pipemakers had plagiarized Gouda marks - Gouda makers alleged that even the Gouda arms was copied (Helbers and Goedewaagen 1942: 19). Until the origins of the Westerwald pipe industry have been traced, little can be said with certainty, but it seems almost certain it must have been founded by Dutchmen - who appear to have gone as far afield as the south of France and Sweden making pipes - perhaps, as Dienemann and Burre suggest, in the middle of the C17.

Though now joined, Höhr-Grenzausen was formerly two separate communities. In fact, they were in two different political regions prior to 1803 when the area became part of the Duchy of Nassau (Solon 1892: II, 78). Höhr prior to this had belonged to the Electorate of Trier, Grenzhausen to the County of Wied (Klein 1955: 26) - *Grenze* means boundary. Höhr, as already noted, was settled by potters from Siegburg, and it appears to have become the major pipe-making centre, though pipes are now no longer made there. Among the Gouda pipemaker's guild records translated in Ottawa is a series of exchanges with the Elector of Trier who was protesting the heavy taxes put on Höhr pipes being shipped through The Netherlands for the Hamburg and Baltic markets. Their effect on "two hundred Trier households" was noted in 1789, indicating that pipemaking was a major industry. The clay used came from Mogendorf, ca.6 miles NE of Höhr-Grenzhausen - the Gouda guild said they obtained some through middlemen in Cologne, but it was of poor quality, was little used, and could easily be done without.

Of particular interest is a list of names of pipes being made for export at Höhr in 1789. The following types were being sold in The Netherlands:

Iüdger,
Indger,
Halblangen,
Meusger,
Sie reibger,
Kleijbladzes,
fisch Juder,
Persijes.

The types exported through The Netherlands to "northern countries" - that is, Hamburg and the Baltic, were as follows:

grosse moschlen,
Kleine moschlen,
grosse buckel,
Kleine buckel.

The meanings of these terms is obscure. *lüdger* looks as though it might have connection with "Jew"; and *Halblangen* can be translated as "half-long" or "demi-long", terms which would fit other known pipe terminology. *Kleijbladzes* and *Persijes* both have a Dutch look about them for "ij" for "y" (or "y" itself, for that matter) is not used in native German words; the latter looks as though it might be connected with "Persian". *Fisch Juder*, literally "fish-Jew", is a contemptuous term for a fishmonger - possibly this particular type of pipe was or had been associated with fishmongers. If *moschlen* is the same as *Muscheln* it would mean "mussel shells", which could conceivably relate to shell-patterned decoration on the bowl - such decoration is known on C19 English pipes. *Buckel* means "lump" or "knob"; C19 English pipes are also known to have had bowls with knobby decoration. All these types were apparently fairly short stemmed, or else came in both short- and long-stemmed varieties, for after giving costs including straw, packing, barrels, and freight for these types to their two destinations costs were also given for shipping long pipes there, and 20-*Zoll* pipes to The Netherlands and 25- and 30-*Zoll* (respectively ca.20 5/8, 25 3/4, and 31 English ins - see Appendix III) pipes to the north are noted with prices vastly increased to those quoted for the short varieties.

Pholien (1906: 147) notes a pipemaker at Andernach and another at Kobern, both near Coblenz and not far from the Westerwald, in 1806. The Andernach maker, a Wingerter, is probably of the same family as the Wingender (allowing a slight name change) from Höhr who set up business at Chokier near Liège in 1818 because he found unfavourable tariffs were keeping his pipes out of The Netherlands (Pholien 1906: 144-5), suggesting the duties imposed and protested in 1789 still stood. The name of the guild secretary at Höhr who listed the pipe types noted above in 1789 is given as Peter Ringender - this is probably a mis-copying of Wingender or Wingerder. Typically C19 pipes marked WINGENDER/FRERES/CHOKIER are in the Musée du Tabac at Bergerac, the Museum voor Folklore at Antwerp, and the Musée de la Vie Wallonne at Liège. The great-grandson of the first Wingender of the Chokier firm was running the business when Pholien was writing, and according to M.-G. Lefrancq (*in litt.* 9 October 1969) the firm continued until after WW I; but the family continued at Höhr also, for a Wingender from there exhibited pipes in the 1851 London Exhibition (*Official Descriptive and Illustrated Catalogue* III, 1132).

The firm of Müllenbach and Thewald of Höhr was founded in 1830 and stopped making pipes in 1930, though it still continues in the pottery business (Müllenbach and Thewald *in litt.* 30 January 1968). They too exhibited pipes at the 1851 London Exhibition (*Official...Catalogue loc. cit.*). Pipes with their name or initials on them have been found in New York state (Gifford 1940: 123 fig 27); New Jersey (Lenik 1967a: 45; 1969: 35; Skinner *in litt.* 13 June 1972); South Carolina (cards on file at Institute of Archeology and Anthropology, University of South Carolina, Columbia, seen October 1970); and New Mexico (R.L. Wilson 1966: 47, fig 4,J).

IOH ANN
A stem with ES.S TEI encircling it and lying between two bands of
NE.B ACH
IN.H ORN
decoration comprising crosses and dots, with lines running parallel to the stem at at least the top end of the fragment (the gap between the two halves of the words marks the mould line) came from an C18 site in Westmoreland County, Virginia (Miss V. Mitchell in litt. 30 July 1972). While it seems very unlikely such a fragment would date to that period, being in all probability C19, this stem would suggest, assuming the place involved is indeed Horn and the word is not just an indistinct imprint of Höhr, a German pipemaking centre not apparently hitherto known from the literature. The only Horn known to this writer in Germany is a small town ca.13 miles NE of Paderhorn in north-central West Germany.

According to Sackett (1943: 77) a stem bearing the name of the city of Cologne - presumably, therefore, marked "Köln" - was found at Fort Ridgely, Minnesota, which was occupied between 1853 and 1861 and again between 1865 and 1867. Stem fragments marked apparently GOEBELL/FRIEDRICH and MEISTR-/IHGET- and presumably German have been found in South Carolina (cards on file at Institute of Archeology and Anthropology, University of South Carolina seen October 1970).

There are at least three firms still making pipes in the Westerwald - Wilhelm Klauer Söhne K.G. of Baumbach (founded 1890), Wilhelm Albrecht Simonis of Hilgert, and the latter's brother Richard Simonis also in Hilgert, in that order of size. Klauer produces 3,000,000 pipes a year, firing every day in alternate kilns. The firm of Gebrüder Spang in Baumbach gets unfired pipes from Richard Simonis and fires them. FIG 120 shows a case of fine Klauer products, probably of the beginning of the C20. (Hilgert, a small village, is ca.2 miles NE of Höhr-Grenzhausen; Baumbach, a small town, is ca.1-1/2 miles beyond Hilgert.) Pipes from at least one of these firms were being sold at least as late as 1965 in the United States (I. Walker 1966a: 86, 87 fig 1a and 1b; 1967c: 193, fig 9). To judge from the examples shown in catalogues of some of these firms which probably date to ca.1900 it was not just Peter Dorni pipes which were being plagiarized (cf Gifford loc. cit.; Omwake 1961) during the later C19 - the name of the Glasgow firm of Davidson also appeared on Westerwald-made pipes.

A hint of the unstudied history of pipe manufacture in Central Europe comes from pipes found at Bethabara, North Carolina, a settlement established in 1753 by members of the Unitas Fratrum or "Moravian" church which had sprung from the teachings of Jan Hus and spread through Bohemia, Moravia, and the adjacent areas of Germany and Poland. At Bethabara, pipes dating from 1755 to 1771 and from 1786 to the beginning of the C19 were found in excavated kiln waster-dumps (see 2: VIII). In method of firing these pipes correspond exactly with ones being made in Poland in the later C17, and in shape the Polish pipes are also similar; they are likewise made of ordinary potting clay instead of ballclay, and are of the "two-piece" variety - that is, they are designed to take a reed or similar stem and are thus made in the form of a bowl and stub stem. Their manufacture at Salem, near Bethabara, continued at the pottery there through the C19 certainly as late as 1882 (Bivins 1972: 111 fig 46) and no doubt until the pottery closed when the last potter there died in 1902. Journeymen potters continued the tradition, however, producing a pipe known as the Moon Shine pipe (Albright 1958: 24); in 1967 a former colleague of the writer obtained a non-anthropomorphic bowl apparently of fire- or brickclay in Salem, and anthropomorphic pipes with a turbaned head are still being made from an old Salem mould (I. Walker 1971a: 28).

According to Cassidy (1895: 22), who is certainly not a scholarly source, a Dr Vikarius two centuries ago had accidentally invented the "jointed pipe-stem" so characteristic of German pipes: presumably this is a reference to a story involving some alleged invention ca.1700 of the idea of a separate bowl and stem for a pipe, but the story is unknown to this writer (cf 1: VII(g)).

In a preliminary overview of the origins of the Bethabara pipes this writer (I. Walker 1971a: 27) suggested that the stub-stemmed earthenware pipe originated in Central Europe in response to the needs of English and Dutch mercenaries during the Thirty Years' War, 1618-48, who unable to obtain the white clay pipes to which they were accustomed, were forced to have crude earthenware pipes made for them, but subsequently-available evidence now suggests another origin for these pipes. In a study of Polish pipes, Żurowski (1951) points out that there are two distinct types of clay pipes found in Poland: the conventional long-stemmed ballclay pipe, which in Poland appear to be either Dutch imports or copies of them, and the bowl and stub-stem earthenware type. The former pipe is called in Polish fajka, which derives from the German Pfeife, pipe, a term for a smoking-pipe represented in closely analagous forms throughout western European languages and presumably originating in the English term pipe; the stub-stemmed earthenware pipe, however, is called a lulka, a word which is derived from the Persian word lule meaning inter alia a tobacco-pipe, in which sense it also appears in Turkish. In view of the extents of the Polish and Turkish empires in the C16 and C17, when they had hundreds of miles of common border, it would not be surprising to have Turkish influence entering Poland from the south just as the fajka obviously came into Poland from the west through Germany; and it now seems highly likely that the Central European stub-stemmed earthenware pipe derives from Turkish forms (cf examples in Raban 1971: 151-2, 154, 152 illus. upper centre left; also in Brongniart 1844: 190, 191-2, 189 fig 79, G and F, 1854 ed) - A. Dunhill (1924: 235, 237-8, figs 226-9) attributes the similarity in bowl-forms between the Turkish chibouk and on the one hand the typical meerschaum pipe bowl-shape and on the other the typical wooden bowl-forms of Russia, Finland, and Siberia to this same Turkish contact through the Balkans and southern Russia.

Unfortunately, very little is known to this writer on Turkish pipes, but as early as 1610 an Englishman referred to the Turks smoking tobacco "through reeds that have ioyned unto them great heads of wood to containe it [tobacco]: I doubt not but lately taught them, as brought them by the English:..." (quoted in Laufer 1924b: 62), suggesting the English had recently introduced smoking into Turkey and indicating two-piece pipes were in use there from the beginning. Initially, drastic punishment, including execution, was meted out to smokers in Turkey but from the middle of the C17 prohibitions were relaxed and according to Laufer (1924b: 63) "smoking both from the dry pipe and the water-pipe became a general custom". Laufer also quotes (loc. cit.) a traveller in 1675 observing that the finest pipe-heads in Turkey were sold at Lüleburgaz in modern European Turkey, again indicating the use of bipartite pipes; and the 1759-65 edition of Savary des Bruslons's Dictionnaire universel..., where the entry on pipes is probably basically early C18 in date (see p. 54 n. 16), says the Turks used pipes three or four ft long with a reed or wooden stem and an earthenware bowl which was removed after smoking (Savary des Bruslons 1759-65 ed: IV, col. 200) (this is repeated in the 1762-64 Dictionnaire domestique portatif,... (Roux et al 1762-64: II, 357)). The available evidence would suggest, therefore, that any time from the early C17 the lulka form of pipe could have been finding its way into Poland. Examination of Central and Eastern European museum collections for both types of pipes is much to be desired, for Żurowski's early article can now be seen to have much wrong or suspect dating of material.

A survey of the evidence at present available for the spread in the United States of the distinctively American stub-stemmed pipe industry is given in Section VIII below (see also now I. Walker 1975a).

SECTION IV:
BELGIUM AND LUXEMBOURG

The earliest known pipemakers in what is now Belgium are recorded in 1639. One of these, Denis Derasse, apparently had a chequered and largely unsuccessful career as a pipemaker in Tournai. Soon after setting up business he took on two partners, and one of these took over the enterprise in 1642. About that time the firm received a three-year monopoly to be sole manufacturers of pipes in the city, but even then the business was not a success, and it soon closed. In 1671, Derasse, now 70 years old, opened his business again with another partner, but ran into problems with the potters at Tournai, and was unable to fire his own pipes. He obtained another three-year monopoly which was extended in 1674 and again in 1677, and in 1675 successfully sought a ban on the entry of pipes into Tournai from other centres; but the business still failed to prosper, the number of workers employed having fallen to two or three by 1677 from nine, including four moulders, in 1671. A condition of the renewal of his monopoly in 1677 was that he take more workmen, but the monopoly is not renewed in 1680 and Derasse and his business disappear from the records. Derasse and all his partners have French names (Soil 1886: 189-92; Pholien 1906: 141). The other pipemaker first recorded in 1639 is Jean-Baptiste Chabotteau - again a French name - who is recorded by M.-G. Lefrancq (in litt. 9 October 1969) at Namur for the years 1639 to 1641. Nothing further appears to be known about him - indeed he is the only pipemaker recorded by Lefrancq at Namur. Another early Belgian pipemaker is Jan Trademus, who according to family records is believed to have been the first Ghent pipemaker, starting there a little before 1665 (Ons Heem 1963: 179 s.v. (Gent) - Pijpenbakker).

In 1691, a Jean Gravier came from Valenciennes (modern France, département of Nord) to Tournai and obtained a monopoly to make pipes. He requested from the city a free house, 200 florins a year (the allowance given him at Valenciennes), exemption from taxes, and a monopoly on production; and in return promised to make "as many pipes in a day as the town can use in a week". He was given these privileges for five years, a period almost immediately increased to ten. Two years later he opened a marbled tile and Alicanti soap factory, which may indicate that pipes were still not popular enough for a maker to earn his living solely by producing them; but among his occupations he must have been making a good profit, for in 1695 the terms of his monopoly were changed and instead of his being paid 200 florins annually he now had to pay a tax of 425 florins. In 1699 Gravier, having met with some disfavour, had to retire to Ghent, and his factory was continued successively by his wife (who stopped the tile manufacture), one of his workers, and finally in 1706 by the son Jacques, who reintroduced tile manufacture but with little success and had left Tournai by January 1710.

The City Council, who apparently were anxious to see the pipe trade successfully established in Tournai, asked in 1711 or 1712 a Dutchman Dirick-Marlinck, to set up the business, making Dutch-style pipes, but he was as unsuccessful as those makers previous to him, the war in the Low Countries preventing him getting his clay, and at one stage he had to sell his clothes to live. He too went in for tile manufacture in an attempt to earn a living, but after 1714 he is not heard of again (Soil 1886: 192-8; Pholien 1906: 141-2).

In 1714 a maker with a French name, Nicolas Pinçon or Pinchon, set up business in Tournai, claiming the following year that more than 20 or 30 families would be supported by the workers he was going to employ. In 1716 he had six workers and was building another kiln, and in 1717 he had 15 workmen and his pipes were being sold in the nearby towns of Lille, Douai, and Valenciennes. By this time he had built three new kilns, but high import duties levied on his pipes by the French and low import dues on foreign pipes in the Low Countries were making his business difficult. In 1722 he wanted assistance from the Tournai council to build a kiln to make "porcelain pipes", but the city fathers offered him no encouragement, so he went to Mons (also in modern Belgium) where, apparently, the Council had been requesting him to set up business for a long time. After Pinçon's departure a German pipemaker who had been working at Raismes on the NW outskirts of Valenciennes, Robert Stevels, asked in 1725 for permission to set up in Tournai. He was allowed to do so on a trial basis, but nothing more is recorded of him. Pinçon's wife continued the Tournai business with several workmen until 1727, when his son-in-law Michel-Joseph Petit, who had already established his own business in Tournai, took it over, and starting with five or six workmen, ran it until his death in 1779. In 1749 he also started tile-making. His son Antoine-Joseph, was set up in business in Mons in 1793. A son-in-law of Charles-Joseph, a M Renard-Petit, re-established the Tournai industry in 1817.

Charles-Joseph died in 1858, and was succeeded at the Mons factory by his son Jules. In 1868 a nephew of Charles-Joseph, Firmin Petit, succeeded, but in 1870 the factory closed. The period of greatest prosperity for the firm was under Charles-Joseph in the middle of the century: in 1847 sixty workers were employed, in 1855, seventy. Medals and honourable mentions were obtained at exhibitions at Tournai in 1824, Haarlem in 1828, Brussels in 1835 when the jury said his pipes were "as good as those of Gouda", and in 1847 when his sample of 191 pipes included two a metre (over 39 ins) long, and Mons in 1851. The factory used from 1804 until 1870 was at what is now 22 rue Antoine Clesse until 1965 - remains of the kiln can still be seen in the basement of number 24. The demolition of number 22 revealed vast quantities of pipe-fragments. The marks "Petit/à Mons/Brevete" or C.J. PETIT/FABT/MONS occur on the stem; a circular heel-mark with .C.PETIT round the edge also occurs (Soil 1886: 198-203; Pholien 1906: 142-4; Lefrancq 1970a; 1970b, which last shows the Petit property on rue Antoine Clesse, a picture of Charles-Joseph Petit, and examples of his pipes and their markings).

By ca.1830, pipemakers had set up business all over Belgium - though M.-G. Lefrancq's work (in litt. 9 October 1969) makes it clear that Andenne and its suburb Andenelle remained by far the largest production centre - but many of the pipes smoked in Belgium must still have been imported, for in four years in the 1860s an average of nearly 4,000,000 pipes, two-thirds from The Netherlands and the rest from France, were being imported a year (Pholien 1906: 146). Belgian pipes were, however, themselves exported: in 1860 ca.825,000 were exported, about half to The Netherlands and the rest divided between England and the Indies (Lefrancq 1970a). Figures in Pholien (loc. cit.) for the value of Belgian pipes exported in the years 1834, 1851, 1855, and 1860 suggest the middle 1850s saw the height of the export industry.

The best clays were noted as those from Andenne, Germany, and England, and these were mixed in proportions according to the amount of sand they contained. Tournai and Mons pipes were made of Hautrache and Andenne clay mixed. Duhamel du Monceau notes (1771: 7) that it was alleged that Gouda makers used clay from near Antwerp, but he doubted this as his own source for information on the Gouda industry indicated the clay used came from near Cologne in Germany and above all from near Liège - presumably Andenne. The reference to a clay-deposit near Antwerp is interesting, however, for there is a 1644 reference to clay from Roosendaal in The Netherlands, ca.25 miles north of Antwerp (Douwes 1964: 365) and according to M.-G. Lefrancq (in litt. 9 October 1969) a pipemaker named Petri still works at Schoten, ca.4-1/2 miles NE of Antwerp (see also 2: IX).

Pipemaking was established in Courtrai in the second half of the C18, and the De Bevere family made pipes there from the early C19 until 1950, producing ca.30,000 pipes a week as late as ca.1930. When the business closed, one of the workmen, Robrecht Laporte, who had been with the business from 1913 and whose father had worked there before him, bought some of the moulds and equipment and set up business on his own, moving to Kuurne ca.2 miles NE of Courtrai in 1954. His son-in-law, Frans van Overschelde, took over the business in 1965 and in 1971 it was still producing pipes and had three employees (Van Hoonacker 1971; see also 2: III).

The first pipemakers recorded at Mons came from Tournai in the C18 and presumably used the French technical terms noted by Duhamel du Monceau as being used there. If so, however, these terms did not survive, probably because the dominant element among later pipemakers was German (Javaux 1935: 10; cf Jean-Léo 1971: 8 n.1). In 1846 another native of Höhr, J.-J. Knoedgen, started making pipes at Bree, Limbourg province, near the Dutch border, and the same person, or family, seems to have been working in Liège in 1857, probably continuing the business of P. Regout of Maastricht who had obtained permission to establish a pipe-manufactory at Liège in 1770 (Pholien 1906: 144). Pipes marked "Knoedgen/à BREE" are in the collection of the Museum voor Folklore, Antwerp - one example bore a transfer-printed portrait of General Botha, which indicates the firm was still in existence ca.1900 though Pholien makes no reference to the firm in the present tense.

Brongers (1964b: 31) mentions English pipemakers settling in various centres now in northern and central Belgium - Flanders, Limbourg, Namur, and Liège provinces (including "Andêmes" which must be an error for Andenne) - at the beginning of the C17 but nothing more is said about them. In view of the pronounced German influx to the area later, and the lack of success of the Tournai industry in the C17 and C18, it seems likely that there were no previous major production centres. Probably the minor needs of present-day Belgium were largely supplied in earlier times from Gouda, and a story recounted about a successful Dutch effort to close a newly-established pipe factory near Ostend bears this out. The Dutch in 1765 purposely wrecked a large ship loaded with pipes near Ostend: under port law the cargo had to be taken and sold in the city, naturally at a very low price, and this forced the new factory to close (H.E. Smith 1860: 212-3, quoting Macpherson's *Annals of Commerce*).

It is probably significant that the Andenne industry began when the Gouda industry was in decline and its exports to places outside The Netherlands falling. According to one of Duhamel du Monceau's sources (1771: 7, 8) the Dutch used Andenne clay, so the decline in the Gouda industry would have been felt at Andenne. This would have created the need (from the point of view of the local economy) and the opportunity for a replacement industry, and it is at this moment - 1768 - that the first Höhr pipemaker appears at Andenne.

However, Andenne export of clay still continued, for ca.1783 a Charles Wouters, brother of an Andenne delftmaker, lived in Gouda and acted as an agent for Andenne clay (cf Duhamel du Monceau 1771: 7). At that time delft factories in Gouda and Delft used large quantities of Andenne clay, and at the beginning of the C19 two pipemaking concerns in Gouda, Stomman and Prince, used enormous amounts (Javaux 1935: 4 and n.3). Javaux also noted the Dutch were still using Andenne clays when he was writing, and a handwritten note on Javaux's remarks in this writer's copy of Javaux noted Gambier of Givet in France also used Andenne clay.

The Gouda pipemaking guild records contain two letters from one Pieter Lansheer in 1786 who was then at Huy, ca.7 miles down the Meuse from Andenne and ca.19 miles from Namur. Lansheer claimed that all the clay being mined in the area between Huy and Namur was being dug by small speculators and was extremely bad in quality, being full of lime. It shrank drastically on firing and turned reddish, though some of it had the appearance of excellent quality. The only good clay, Lansheer averred, was that dug by a certain Walters or Woters, who was mining it from more than 400 feet below surface and whose brother lived in Huy. An undated copy of a reply sent by the guild to Lansheer is courteous if wary, but said it looked forward to receivng samples of Woters's clay and that if it proved to be as good as claimed it would be ordered. No further references to this matter are recorded, but in view of Javaux's remarks it seems likely this clay was found acceptable and Woters's brother, perhaps the one at Huy, went to Gouda to act as his agent. Two Joseph Wouterses, pipemakers, are known from Andenne at this period, the first being noted 1783-86 and the second 1794-1805 (*Ons Heem* 1963: 164). (There has probably been a long history of pottery manufacture at Andenne and at neighbouring places in that area of the Meuse valley - there was a major industry from the end of the C11 to the second half of the C14, initially at Andenne and subsequently also at Namur, Amay near Huy, and probably Liège whose products have been found in northern and eastern Belgium, The Netherlands, and in one instance in England (Borremans and Warginaire 1966: 79-88, fig 34, and *passim*).)

Javaux notes (1935: 11) that the Andenne pipe industry was prosperous at the beginning of the C19, that it then declined, but that it reached its height between 1855 and 1875. Since Javaux's time, however, the Andenne industry has declined to the point where it now makes pipes only for shooting galleries (Musée Communal de la Céramique, Andenne, in litt. 5 February 1968; cf Neve 1960). (The last of the original Heurter family which had arrived in Andenne in 1768 gave up business in 1929 (Javaux 1935: 16) but at least as late as 1961 one of the makers in the family still lived in the town (quoted by Musée Communal de la Céramique, Andenne 1968). The factory of the last Heurter was still in existence in 1960, though being used for other business (Neve 1960: 28).)

Pipes marked "Heurter/Andenne/Depose" are in the collection of the Musée de la Vie Wallonne, Liège, in which collection there are also pipes marked "Daniel/a Andenne/...". The Museum voor Folklore at Antwerp has pipes marked "V. Leblanc/Andenne" and "R.[or H.?]/Lesuisse/à Andenne/Deposé". The firm of Leblanc was in existence by the 1880s and became Leblanc-Lesuisse when the son-in-law of the original owner succeeded. About 1900 the firm's mould-maker and -repairer, Daniel Verheylewegen, took charge, though he subsequently specialized in manufacturing asbestos and wooden pipes. Verheylewegen used the mark "Daniel" on his products (Javaux 1935: 16). A pipe marked "D. BARTH/ANDENNE/Belgique" in the Musée Communal de la Céramique, Andenne, is the product of Desiré Barth, who commenced pipemaking in the rue des Pipiers, Andennelle, a suburb of Andenne, in 1855. This business ceased in the later 1880s but in its time was the most important of the Andenne pipe factories, producing almost 1,000 gross a week in 1862 and having a staff of 120-130 in 1870, 40 or 50 of whom were moulders. Barth at one time was sending thousands of gross of a short pipe with a bowl decorated in an overlapping fish-scale motif to California (Javaux 1935: 15). What may be this pattern occurs on a stem fragment immediately abutting the bowl which was found during excavations at the site of Sutter's Sawmill, scene of the California gold rush in 1847, though the excavator refers to the motif as a feather pattern (Fenenga 1947: 56, pl 1,7). Overlapping scale or shell motifs, however, are by no means uncommon on C19 pipes from several countries - Anna Viner of Bristol, for example, used this motif (see Appendix IX).

The firm of Wingender, established at Chokier near Liège in 1818, has already been noted when dealing with its German connections, as has the Bree firm of Knoedgen. The case with 87 pipes, four miniature pipes, and a cigar/cigarette holder which the firm exhibited at the Philiadelphia Exhibition in 1878 is on show in the Musée de la Vie Wallonne (FIG 124); when Pholien was writing, the firm had six kilns and ca.1,500 different models of pipes (Pholien 1906: 145). As previously noted, the firm was still in business after WW I. Knoedgen, on the evidence of the General Botha pipe mentioned previously, must have remained in business at least until ca.1900. Pholien (1906: 144) notes the firm of A. Trees of Liège, founded in 1820, was still making pipes in 1906 and was run by Antoine Trees, a direct descendant of the founder. At that time the firm employed 20 workers and had two kilns. It specialized in white-clay culottants (coloured - i.e. seasoned) pipes known as crème liégeoise and in enamelled pipes. A superbly-moulded bowl in the Musée de la Vie Wallonne depicts one J. D'Amorimont "Le bourmestre" (of Liège?) and bears the name of the Trees firm. It suggests the firm produced superior-quality pipes.

The firm of Nihoul, later Nihoul-Gaulier, worked at Nimy, a northern suburb of Mons. It was founded in 1841 and was still in business in 1898 (Pholien 1906: 145). Pholien implies it no longer existed by 1906, and local information (Musée Jean Lescarts, Mons, in litt. 17 January 1969) says the firm closed in 1900. Products of this firm, marked "Nihoul/à Nimy" sometimes with "Deposé" in a third line, are in the Museum voor Folklore, Antwerp; the Musée de la Vie Wallonne, Liège; and the Musée du Tabac, Bergerac, France. According to Lefrancq (1970a) Nihoul sometimes fraudulently used the mark "Nihoul/à Onnaing", presumably to try to steal sales from the pipemaking firm of Scouflaire at Onnaing in France (see following section). The Scouflaire firm was started in 1825 by two brothers from Nimy and their wives, one of whom was the daughter of a Nimy pipemaker; in 1834 they opened another factory back in Nimy, and there is a pipe marked "Scouflaire/à Nimy" in the Musée de la Vie Wallonne at Liège. Lafrancq notes the French buying Nimy pipes and the Belgians buying Onnaing pipes. A Jean-Charles-Joseph Nihoul-Polet, perhaps an earlier relative of the Nimy Nihoul and Nihoul-Gaulier family, was born in 1780 and was making pipes in Andenne by 1814. He died in 1845 (Javaux 1935: 14).

Pipemaking in Luxembourg probably came up the Moselle from the Westerwald area. In the Eiffel, the area north of the Moselle, pipemakers are noted at Zimmern in 1764 and at Orenhoven before the French Revolution. The three or four.Zimmern makers made ca.4,000 gross pipes per annum, selling them in the surrounding areas and in France. The first pipemakers actually recorded within the Grand Duchy appear during the second quarter of the C19, at Grevenmacher and Remich, both on the Luxembourg side of the Moselle from Germany, and at Dalheim, a few miles west of Remich (Schmitt 1957: 159-60; Sprunck 1957: 68).

SECTION V:
FRANCE

Little definite appears to be known about the origins of the north French industry. In the 1590s French students at the University of Leyden in The Netherlands were smoking (Dickson 1954: 131), and as early as 1564 French settlers in Florida were apparently smoking the clay bowl and cane stem pipes of the natives there (Dickson 1954: 129, but see 130-1). In 1616 there is a reference to American Indians smoking "as is done in France" (Thwaites (ed) 1897: 117), and in 1629 the poet Saint-Amant wrote a sonnet in which he described himself seated "une pipe à la main" (part of the sonnet is quoted in Coolen 1970: 387 n.3; the entire poem is given in Bastien 1973: chapt 2, where the poet's name is spelt Saint-Aman). According to Lefrancq (1970a), the word pipe is first recorded in France in 1620;the Larousse Nouveau dictionnaire étmologique et historique (1964) gives 1626. The term may only have been introduced (presumably from the English) about this time, for the 1617 edition of Olivier de Serres's Théâtre d'agriculture talks of smoking tobacco with a cornet - the absence of this phrase from the 1600 edition of Serres suggests pipes were little known in France at that time (quoted in Franklin 1906: 571 and n.3).

By 1620, tobacco was being grown in Artois - approximately the present Pas-de-Calais département - and ca.1630-40 was being grown in the immediate area of Saint-Omer, which seems to be one of the earliest French pipemaking centres. There were 17 tobacco manufacturers at Saint-Omer in 1750; in 1785, 28 (Jakowsky 1956: 24; Coolen 1970: 388). Even to-day, the tobacco of the Artois area includes some of the best grown in France, and the neighbouring département of Nord is among the largest tobacco producers in France (Herment 1956: 112, 1965 ed).

Suitable clay for pipemaking was known in the area from the beginning of the C18, and Saint-Omer, Boulogne, Arras, Béthune, Fruges, all in the Pas-de-Calais, were pipemaking centres from early in that century (Coolen n.d.; followed by Jakowsky 1956: 23; cf Fresco-Corbu 1962: 1445, who appears to be using Jakowsky and/or Coolen extensively). By the end of the C17 pipemaking appears to have been widely spread in France (Jean-Léo 1971: 13-14, cf first page of illustrations in unpaginated section following p.55), but it was not until the second half of the C18 that a real French clay pipemaking industry arose, no doubt because snuff remained the only fashionable way of taking tobacco in France until the C19 (Franklin 1906: 667; Laufer 1924b: 54; Herment 1952: 16-17, 1965 ed; C.T. Shaw 1960: 287; Lotte 1963: 36, cf Laufer 1924a: 32; Mackenzie 1957: 163).

Recent preliminary documentary research on goods shipped to the French American colonies, specifically to Louisiana, from La Rochelle in the C18 indicates the vast majority of pipes shipped came from The Netherlands, though French-made pipes from Rouen, Strasbourg, and the Languedoc and Provence regions are also noted (Chapelot and Chapelot 1972: first, eighth, and tenth pages; Chapelot (ed) 1972: 89 pl 55 (caption on p.103)). Pipemaking in the C17 and C18 in these areas of France is known from other sources and noted below; the observation that Dutch pipes were commonly exported to the French possessions in the New World is supported by finds from excavations of Canadian and American C18 sites with French occupation, which indicate the French used Dutch, particularly Gouda, as well as English pipes (I. Walker 1971c: 117 and passim; cf Omwake 1965b: passim; Wylie 1968: 30 and passim; Davoud, now MacLean, 1969a: 3; 1969b: 4, 6, 18; MacLean 1971: 22, 24, and passim; Grange 1971: 560 and passim; Lafrenière and Gagnon 1971: 90 and photo 20; McClurkan 1972: 33).[8]

According to Coolen's recent study of pipemaking in Saint-Omer, the industry started there at the end of the C17, when Louis-Alphonse de Valbelle, who became bishop of Saint-Omer in 1684, founded the Hôpital général to group together the various existing houses of charity. Here girls were taught linen-making and boys to make fishing-lines and pipes. In 1712 one Adrien Cauche, a "master pipemaker", supplied necessary tools and clay from England, and was entrusted with the selling of the products. (The English appear to have blown hot and cold on the export of pipeclay in the C17 and C18 (see 2: IX); the use of English tools is interesting, but there is no evidence of English influence in Duhamel du Monceau's account of north French manufacture 59 years later.) In 1747 a certain Minet disposed of his pipemaking equipment to the Hôpital for the sum of 1,131 livres 14 sous, which suggests he disposed of an entire business. English clay was still used because of its whiteness, though local clay was also used. These attempts to set up the industry, however, do not appear to have lasted long; the business was restarted in 1792 but closed again 1796 because of lack of raw material and capital (Coolen 1970: 391 and 393).

Other sources indicate that Minet was probably working ca.1700 in Saint-Omer, to be followed by Charles-Marie Roussel (sometimes Houssel) who was working there before 1730 (cf Coolen 1970: 391). Until that date the clay from Menneville, just outside Desvres (Pas-de-Calais), had fired red, but Roussel perfected its firing in a manner (see 2:I) which resulted in a product as white as fired Andenne clay - in fact Andenne clay fired slightly red and Menneville clay pipes still fired slightly red inside to the bowl (Duhamel du Monceau 1771: 11-12, 9; Brongniart 1854 ed: II, 186, 187); Tomlinson (ed) 1852-4: II, 451; cf Jakowsky 1956: 25, 26).

The most famous Saint-Omer pipemaking firm was that of Fiolet. According to Jakowsky (1956: 25-6; also Jean-Léo 1971: 19, 30) the firm was founded in 1765 and closed in 1921. Coolen, however, notes the earliest-known Fiolet, Thomas, was working as a master-pipemaker at the end of the C17, and that his son, Charles-Dominique, was a master-pipemaker in 1713; he also notes the firm closed in 1919 (Coolen 1970: 393, 400). (There are differences between Coolen's and Jakowsky's accounts, but the former is probably more accurate; the 1765 reference in Jakowsky is to the building of the first workshops which may indicte the beginning of the family business as a major industry.)

Charles-Dominique Fiolet, son of the first Fiolet pipemaker, had at least two sons: Charles-Joseph-Dominique (1745-1812), and Louis-Joseph (1754-1806), the latter also being a pipemaker. The latter's son, Louis-Maximilien père (1782-1834), succeeded his father, and was in turn succeeded by his son Louis-Maximilien fils (1809-92). Following his death, his son-in-law Georges Audebert continued the business until it closed

(Coolen 1970: 393, 400). In a recently-discovered document (Coolen 1971), Louis-Maximilien *père* describes the firm and its products in 1819. The description of the manufacturing process is noted and discussed in 2: I, but the description of the factory is given here because it affords a comparison with that given for the factory later in the C19 when Louis-Maximilien *fils* had built new works and the firm had reached its zenith, and this latter description is given below.

In 1819 the firm employed between 400 and 500 workers, most of whom had been with the firm for 20 or 30 years. Fiolet stressed the advantages of having the workmen's wives and sons and daughters all employed together; children started work when aged ten. The weekly wage bill for the workers was between 1,800 and 2,000 francs. The firm's pipes were sent throughout France, particularly to Paris, Bordeaux, and Brittany. Formerly many had been exported to the colonies but at present this had almost ceased (no reason is given). The manufacture of French pipes, Fiolet opined, would be greatly increased if there were, failing an outright prohibition, at least higher duties levied on Dutch pipes - "*On connaît le préjugé malheureux qui existe en France que tout ce qui est étranger doit être meilleur*" (Coolen 1971: 446). Fiolet noted that "*dans les derniers temps calamiteux*...*malgré la stagnation des affaires*" he had kept on his 400-500 employees. Unfortunately Fiolet does not indicate what his annual production was.

As noted above, under Louis-Maximilien *fils* the firm reached the height of its fame; and it also began its decline. The works on the rue du Faucon (now the rue Thiers) were built at this time, complete with 12 h.p. steam engines, three square kilns each of over 12 cubic metres capacity, now fired by coal and not wood as was the case in 1819, producing 60,000 gross pipes at 100 to 120 firings a year. More than 700 workers were employed, including women and children. At this time too, pipe-bowls in the form of historical or mythological persons were produced, and glazed pipes with the name of the smoker or that of the *Cercle des Quatre-Moulins*, a group which met each Sunday in the hostelry of that name. At one time, 80,000 pipes a day were being produced and exported all over Europe and to Africa and America. According to Jakowsky (1956: 25), who is probably using the 60,000 gross figure mentioned by Coolen above, the firm was producing over 8,000,000 pipes a year, but at the Crystal Palace Exhibition of 1851 Fiolet was recorded as producing more than 200,000 gross pipes in 1,200 shapes, plain and ornamented (Fresco-Corbu 1962: 1445-6), and this represents almost 29 million pipes, a figure more in keeping with Coolen's other figure of 80,000 pipes a day, which for a six-day week and over 52 weeks would amount to almost 25 million. (Except where otherwise noted, information on the Saint-Omer industry comes from Coolen 1970. An earlier, much shorter, and undated account by Coolen (n.d.), much of the information in which is similar to Jakowsky 1956, gives differing information on certain points. It is assumed here, as it is assumed with Jakowsky 1956, that Coolen 1970 replaces earlier publications.) In 1853 it was recorded that two Saint-Omer firms (presumably Fiolet and Duméril) made 45 million pipes between them out of 11,000 tons of clay. This suggests, when compared to the previous figure, that Fiolet produced nearly twice as many pipes as Duméril at this time (Fresco-Corbu 1962: 1445).

From the later 1850s, however, the cigarette and brier pipe made inroads on the clay pipe market. Taxes on the superior-quality Saint-Omer pipes cut sales abroad and Belgian-made imitations of inferior quality were able to avoid these taxes. In 1892 Louis-Maximilen's son-in-law George Audebert took over the firm, but its days were numbered. According to Coolen (1970: 400) the firm closed during the WW I because of lack of raw material and manpower and re-opened in 1919 only to close for good after a few months. An idea of the prosperity of the firm at the height of its business can be had from Louis-Maximilien's philanthropic works: apart from opening a *Caisse de prévoyance* for his workers which gave interest-free loans, he helped found the *Société philharmonique* and built the present *Salle de Concerts* (Coolen 1970: 395). (FIGS 125-27) show the site of the Fiolet factory, the last parts of which were apparently demolished only a few weeks before these pictures were taken in April 1969.)

The Duméril firm, later known as Duméril-Leurs, was founded in 1845 and closed in 1885 according to Coolen (1970: 399); ca.1895 according to Jakowsky (1956: 25). The family belonged to the Abbeville cloth trade, and the founder of the pipe firm, Constant Duméril, was the son of the director of the military hospital in Saint-Omer, Florimond Duméril (Coolen *loc. cit.*). Jean-Léo (1971: 30) gives the firm's dates as 1844-ca.1885; he also indicates that the "Leurs" in the firm's name was part of a full name which was "Duméril, Leurs Fils & Cie" (The Dumérils, their Sons, and Company), and that the firm's founder, Constant Dumeril, was mayor of Saint-Omer. In 1846, again according to Jean-Léo, the firm was employing some 350 workers, almost all of them Belgian. The last member of the family gave a collection of pipes, said to comprise an example of every type made by the firm, to Saint-Omer (Jakowsky 1956: 23); this collection, housed in the Hôtel Sandelin, has an estimated 3,000 pipes, pipe-bowls (including a few of porcelain), and cigar- or cigarette-holders. A Duméril-Leurs stub-stemmed pipe with the bowl in the form of a head with long hair and a full beard is known from a site in Ghana (Calvocoressi MS).

It was not possible in April 1969 to examine these pipes other than through their glass cases, but the most common identifying mark was "Duméril/Leurs/à S^{t} Omer/Déposé*" sharply impressed on the stem. Several pipes in the collection of the Bristol tobacco firm W.D. and H.O. Wills as well as an example in the Cuming Museum, Southwark, London, and another in the Simco County Museum, Ontario, Canada, have "E. Duméril/E. Bouveur/à S^{t} Omer" impressed on their stem; Jean-Léo (1971: 30) notes that when Constant Duméril died the firm was taken over by E. Duméril and E. Bouveur - unfortunately no date for this useful change in marking the pipes is given, but it must have been by 1877 as the firm has a London office with the double name in that year (Bloice in Atkinson and Oswald 1969: 219 - Bouveur is spelt Boumier there). One stem was noted marked "VILLAR.../CLERMO...", presumably the product of a maker at Clermont-Ferrand (*département* of Puy-de-Dôme) in the Auvergne, though none is noted there by Jean-Léo. Why this apparently isolated example should be seemingly associated with the Duméril Collection is unknown, unless it is the product of a firm taken over by the Duméril concern. Just how many Dumérils and their sons were involved in the firm, as implied by Jean-Léo's indication of its name being Duméril, Leurs Fils & Cie, is not indicated. The firm was also famous for its figurines (Coolen *loc. cit.*) and these too are on display with the pipe collection at the *Hôtel Sandelin*.

Duhamel du Monceau gives no history of pipemaking in northern France, but the very lack of references to the origin of the industry there suggests it had been established a considerable time before his writing, which might agree with the ca.1700 date suggested for Minet and the first Fiolet. Duhamel du Monceau's one reference to the past is an incidental mention of the Dunkirk industry's having been started with Dutch workmen (1771: 8). According to Jean-Léo (1971: 11, 25), Dunkirk - at that time a prosperous free port involved in the tobacco-industry - was the earliest French pipemaking centre, the first workshops appearing in the first half of the C17; however, no makers' names are mentioned. Coolen (1970: 389) also indicates Dunkirk saw the earliest north French production, but that Saint-Omer appears to have become the major centre; Duhamel du Monceau implies Dunkirk was still the major French pipemaking-centre in his time, though this may simply reflect his available sources. The unpublished Gouda pipemakers' guild records translated in Ottawa refer to Dunkirk bribing Gouda pipemakers in 1749 to move to Dunkirk at a time when Gouda trade was slack, and to Gouda offering the workmen 26 guilders each and a promise of priority in finding work to come back; this may be an event referred to by Jean-Léo (*loc. cit.*), though dated by him to 1751, when a certain M de la Ruelle was given a ten-year monopoly to manufacture "faience" pipes and set up business with Dutch workmen. The Dutchmen recommended the use of Andenne clay, the clay used at Gouda, and Dunkirk pipemakers henceforward abandoned the use of Hautrage clays. De la Ruelle's widow continued her husband's business and monopoly; in 1783 it was being run by a widow Moret and her sons. Savary des Bruslons in the 1759-65 "new" edition of his *Dictionnaire universel*..., where the entry on pipes is still probably basically early C18 in date, mentions no French pipe-making centres other than Rouen (see below) except for a passing reference among various taxes levied on pipes to one of five *sols* a gross imposed in 1751 on pipes made at Dunkirk (Savary des Bruslons *1759-65* ed: IV, col. 200); but another mid-C18 French source, the *Dictionnaire domestique portatif*,... published 1762-64, whose entry under "*Pipe*" is virtually identical to most of Savary des Bruslons's account and is almost certainly copied from the 1759-65 edition or an earlier edition of that work (see p.54 n. 16), includes the comment that "*Il s'est établi, il y a quelques années, une fabrique de pipes dans la basse-ville de Dunkerque*" (Roux *et al* 1762-64: II, 357).

A bowl with the superbly-moulded coat of arms of Louis XV of France and his wife Maria Leszczynska of Poland and the words MANUFACTURE ROYALE and DUNKERKE on the pennons held by the royal supporters, two angels (FIG. 128, a-c), was recovered from a 1741-68 context at Louisbourg (C. Lindsay *in litt.* 6 December 1972). The bowl, which is heeled, is typically Dutch in shape, and also has the careful rouletting immediately below the lip. Its discovery clearly indicates just how much is likely to await discovery when a systematic study of the French pipemaking industry is undertaken, for this writer has not come across any other reference as yet to a Royal Factory at Dunkirk. As Louis XV married Maria Leszczynska in 1725 the arms on the pipe can be dated between that year and 1774, when Louis died, so taking into account the archaeological evidence - and the fact that it is hardly conceivable a French-made clay pipe would have arrived at Louisbourg after 1758 as Louisbourg was captured from the French by the British in that year - it would appear likely that the Dunkirk factory obtained royal patronage sometime in the period 1725-58 (the arms were identified and dated by the College of Arms, London, *in litt.* 22 March 1974). If the apparent pipe-making activity in Dunkirk *ca.*1751 noted above related to the establishment of this factory, as it well may, the pipe should be datable to ca.1751-58. A stem fragment, polished in the Dutch manner and with DUNKERKE round it between decorated lines in typical Gouda fashion, has also been recovered from Louisbourg, in a 1758-68 context (C. Lindsay *loc. cit.*). (The preceding two paragraphs, and the first four paragraphs of this Section, have subsequently been published (I. Walker 1975b).)

In 1758 an observer (quoted in Bastien 1973: 2nd chapt) noted there were three pipe factories in Dieppe (Seine-Maritime), one of which "was expanding daily and giving cause to believe it will shortly be the largest in the kingdom". In 1789 another observer of the Dieppe industry (quoted in Bastien *loc. cit.*) very briefly described how the pipes were made, remarked that the clay came from the Neufchâtel-en-Bray area SE of Dieppe (see 2: I and IX), and noted that the principal maker was one Bretel (Jean-Léo (1971: 25) notes Bretel at Dieppe, but with no comment other than that he was working there in the C18). Bretel's workers were brought from The Netherlands. His best products went for export, principally to America, and his others to sailors and soldiers. At that time ca.200 people were employed in the trade in Dieppe, but following the closure of the *Manufacture des Tabacs* there in 1811 the pipe industry died, and when the tobacco-manufactory reopened in 1853 the pipemaking trade had long since moved to other parts.

Duhamel du Monceau (1771: 6, 25-7) also noted pipemaking at Rouen (Seine-Maritime), observing that although Rouen pipemakers maintained their products were as fine as Dutch pipes they certainly looked markedly less good. Savary des Bruslons (1759-65 ed: IV, col. 200), probably describing the situation in the early C18, is even less complimentary about the quality of Rouen pipes, describing them as being made of a coarser clay than were Gouda pipes and "*d'une vilaine couleur, la plûpart* [sic] *tortues & mal formées*". However, Rouen may nevertheless have been the major French production centre in the early C18, for apart from the incidental reference to the tax imposed on Dunkirk-made pipes in 1751 (see above) which is obviously a late addition to the entry on pipes, Savary des Bruslons mentions no other French pipemaking-centres.

According to Jean-Léo (1971: 12-13, 29) the Rouen pipe industry, using local clay from nearby Saint-Aubin and Bellebeuf, was started by Englishmen who set up business in the Saint-Sever suburb where the street-name rue de la Pie-aux-Anglais is supposed to be a corruption of "*la pipe aux Anglais*". In 1633 there is a reference to a "*marchand anglais faiseur de pipes à prendre petun*" in Saint-Sever whose name (presumably gallicized) was Jacques Veron; in that year he took two apprentices. The mark ascribed to him, a heart surmounted by a crown and the initials I and V on either side of the heart, sounds rather Dutch, but could easily be Herefordshire (I. Walker 1974b: 388), and a number of Rouen marks illustrated by Jean-Léo do look Dutch. Two other Rouen makers of this period, Jean Crenecher and Thomas

Gaye, Jean-Léo suggests are very probably English also. No references to pipemakers of these or similar names occur in Oswald's 1960 list of English pipemakers nor in Atkinson and Oswald's 1969 supplementary list of London pipemakers, but Thomas Gaye certainly sounds English, and evidence may yet be found in Atkinson's research on Southampton and Portsmouth pipemaking at present in progress, for there are the traditional cross-Channel connections between these ports and Rouen and there was pipemaking at both Southampton and Portsmouth from ca.1620 (Oswald 1970c: 227-8). Further, as noted in Section I above, a few years before 1642 the Westminster pipemakers' guild visited Southampton to search for unlicenced pipemakers there working in defiance of the Westminster monopoly, and one can imagine pipemakers in the area there deciding to emigrate rather than face the continual hazards of leading a semi-clandestine existence.

Jean-Léo lists a number of Rouen pipemakers in the C17, and Lesur notes (1957-60: 834) that when a Jean Cottereau was given a 20-year monopoly to produce pipes in Rouen towards the end of the century it was said that 500 Rouen families had been involved in the trade prior to the monopoly. (There is confusion in Lesur's notes on Cottereau's monopoly - the date given is 1693, but it is also noted that Cottereau escaped to England when the Edict of Nantes was revoked in 1685, suggesting the monopoly may have dated to 1683. Cottereau was imprisoned in 1695 for 18 years according to Lesur, but when released his monopoly still had two years to run, so presumably he was released before the 18 years were up; he died in 1716. (Lesur persistently calls him Cottereau Jean, but Jean-Léo is probably right in reversing the order of the names.) Cottereau was born in Nîmes (Gard) in SE France. It would be interesting to know if when he fled to England he went to the Southampton-Portsmouth area.

Hendrickx (1963: 161) implies the first French pipes were made at Rouen and Dunkirk; however, he also notes (loc. cit.) that as early as 1659 Louis XIV had sold the privilege of selling pipes in Paris and in other cities to one Pierre de Montfalcon, which indicates pipemaking in a number of centres in France by the mid-C17.

The use of the word trameuse for trimmer suggests Dutch influence as does scraabes for spew, for this latter must derive from the Dutch term scrables. Geographically and economically northern France-modern Belgium probably looked towards The Netherlands - clay pipes were known as pipes de Hollande (Duhamel du Monceau 1771: 2) - although the manufacture, at least at Dunkirk, of pipes imitating English ones in shape indicate that English shapes found a ready market in France. However, the general lack of Dutch terms indicates that direct Dutch influence was not strong and that the north French industry had probably developed on its own for some time.

Indirect evidence that pipemaking in France was not known on any large scale before ca.1700 comes from the export figures noted (Oswald 1960a: 48, London is the port meant, cf Oswald 1959a: 59-60) for the port of London for the period Michaelmas (29 September) to Christmas 1698 which show that of nearly 45,000 gross pipes exported, 41,000 went to France compared to nearly 2,500 for Virginia and Maryland, indicating a very considerable trade with France and implying little in the way of a native French industry. 1698 was only one year after France had been fighting England and The Netherlands in the War of the League of Augsburg.

According to a study of the Givet pipe industry carried out by scholars of the *Ecole Primaire* and the *Collège Moderne* at Givet (Voisin (ed) [1950]; some additional details on the Gambier firm in Jean-Léo 1971: 35), pipemaking was already flourishing in what is now the *département* of Ardennes by 1677, when a contract was recorded between two master-pipemakers at Charleville, ca.28 miles south of Givet; but the Gambier factory at Givet did not start until 1780. (Lesur (1957-60: 265) notes a Gambier at Givet making pipes "*façon de Hollande*" but is vague about the date, though implying the C18). Gambier utilized clay from Niverlée (ca.6 miles SW of Givet, just over the Belgian border), where mines had been opened the previous year, and from Andenne ca.34 miles downstream (north). In 1848 there were two factories in Givet employing 330 workers, according to one account; another account in 1867 estimated 600 pipemakers worked in Givet, though in 1869 only the one Givet factory was in business.[9] In 1817 the son of the original Gambier took over the firm, and after him the owners of the firm were a M Hasslaur and a M Fiolet; they were succeeded ca.1894 by Hasslaur's widow and a M de Champeaux and a M Quentin. In 1908 they were succeeded by a M Quentin *fils*. (Fiolet was a member of the Fiolet Saint-Omer pipemaking family.) In 1923 only ten pipemakers were working with the firm, and they noted that foreign and particularly German pipes were not subject to import duty and were undercutting Gambier prices because the latter's pipes were still entirely hand made. Even so, however, they were exporting in that year to Canada, Japan, England, and The Netherlands. Three years later, in 1926, the firm closed.

At that time an inventory of the firm's assets indicated more than a million pipes of several hundred different types in stock; the last were smashed or used for target-practice by American soldiers in 1944. As late as 1894, when the best days of the firm must have been over, a catalogue lists nearly 1,600 different models, and the 1926 inventory noted 1,250 moulds which were scrapped. The buildings remain, and are at present used by a slipper-making firm. The ceramic branch of the Gambier firm still exists in Givet, though no longer under the Gambier name (Voisin (ed) [1950]: 7th, 8th, 14th-16th pages, illus. of factory and map on 10th page; Jean-Léo 1971: 19-20). (The *Guide* to the Musée du Tabac at Bergerac (Anonymous n.d. [2]: 6th page) implies the Gambier factory was destroyed during WW I; the *Maire* of Givet (*in litt.* 9 July 1968), noting the Givet premises had closed down after WW I, indicated the few documents on the company which had been kept in the Givet *Mairie* had been destroyed in the evacuation in 1940).

Gambier evidently did not manufacture pipes in Paris, but the firm did have offices and an important shop there, which closed in 1908 (Jean-Léo 1971: 35). The "Paris" marking on Gambier pipes may have been a snobisme; Jean-Léo (*loc. cit.*) notes that when the Gambier firm took over that of Noël of Lyons (*see below*) ca.1890, pipes marked "Noël Lyon" were for the home market and those marked "Noël Paris" for export. Certainly, many pipes marked "Gambier à Paris" have been seen by this writer in Continental museums and have been found occasionally on North American excavations (e.g. Lemieux 1965) - indeed, this writer does not recall ever having seen a Gambier pipe marked "Givet", though some Gambier-marked pipes (e.g. Caywood 1955a: 60, fig 16 nr btm rt; Brose 1967: 62, 51 pl VI,K) with apparently no place of manufacture on them have occurred in North America. (Fresco-Corbu (1962: 1446, fig 5 top example) refers to and illustrates Gambier pipes marked "Paris.") That Gambier continued to make at least pottery with a "Paris" mark until a relatively recent date is indicated by Lesur (1957-60: 265) who illustrates a Gambier ceramic trade-mark registered in 1928 which comprises a rayed, faced, sun with PARIS above, GIVET below, J to the left (as looked at), and G on the right. (Gambier pipes were much plagiarized - see below - but the initials JG inside a small circle on the base of the pipe are a genuine mark of the firm.)

Gambier pipes became so popular in the C19 that "Gambier" became practically a synonym for a clay pipe - Rimbaud, writing in 1871, described himself thinking antagonistic thoughts about the world with a beer tankard in his hand and a Gambier between his teeth.[10] Jean-Léo (1971: 15) notes that the 1922 edition of the Larousse contained the expression "Tête à Gambier" and defined it as "se dit d'une personne à figure grotesque", a reference to the hundreds of moulds depicting caricatures or grotesque animals which the Gambier firm had (see numerous illustrations in Jean-Léo 1971).[11] Voisin ([1950]: 4th page and refs) claims - rather surprisingly, and one suspects, inaccurately - that Gambier pipes were pipes of the less well-off, the wealthier classes prefering an "Onnaing", the pipes produced at Onnaing by the Scouflaire firm (see below). (The comment possibly comes from the same source as that noted in Rimbaud: Oeuvres, p.373 n.7, making the same observation). From the Continental museum material seen by this writer and from Jean-Léo's catalogue and illustrations Gambier certainly appears to have specialized in superbly-moulded pipes, though doubtless he also produced cheaper forms; Scouflaire pipes seen by this writer have been much more modest products (cf reference below to Scouflaire producing Gambier pipes in effect under contract for the Gambier firm).

Pipes marked "Scouflaire/à Onnaing" are in the collections of the Museum voor Volkskunde, Ghent; the Musée de la Vie Wallonne, Liège; the Musée de Folklore, Tournai; and the Musée du Tabac, Bergerac: some Scouflaire pipes have a D within a circle of dots on the heel and some of the products are of a fine red clay; according to the Conservateur of the Valenciennes City Library and Archives (in litt. 8 August 1968) the name can also be spelt Scoufflaire, Scufflaire, and Scuflaire. Onnaing is a small community east of Valenciennes on the road to Mons near the Franco-Belgian border. Between 1820 and 1822 two Scouflaire brothers and their wives, one of whom was the daughter of a Nimy pipemaker, emigrated to Onnaing where they continued in their trade as faience workers while their wives made pipes at home and fired them in the oven. In 1825 the family started a full-fledged pipemaking business which continued until 1936 when the last directeur closed the firm rather than accept the new paid legal holidays. In 1834 they opened another factory back in Nimy in Belgium, though this was never as important as the parent factory, which at one time used to make pipes in Gambier of Givet's moulds when that firm was unable to keep up with orders (cf Voisin's remark ([1950]: 11th page) that after WW I some moulds which had not been melted down as scrap-iron were sold to other manufacturers, particularly those in Liège, and that the Onnaing pipe-factory obtained the "Jacob" moulds). A photograph of the old Onnaing premises shows a large factory with at least three big bottle-kilns. In

1860 the firm employed 200 women and 100 men (Lefrancq 1970a).[12]

At Montereau-faut-Yonne (Seine-et-Marne), ca.45 miles SE of Paris, a pipe-factory was started, taking advantage of suitable local clay deposits at Salins and Saint-Germain-Laval, sometime in the first half of the C19 with workers from Saint-Omer (Colas 1959: 234 and 1962: 31; Brongniart 1854 ed: III, 13, 17; also Rougier 1966a-b, which appears to be largely an unacknowledged copy of Colas 1959 and 1962). The business was founded by one Gisclon and continued by his son-in-law Dutel, who had taken over by 1859 (Fairholt 1859: 188) and later worked in association with a G. Boucher (Jean-Léo 1971: 27). The factory was destroyed by fire on the night of 4-5 December 1895 (Colas *loc. cit.*), but the firm was taken over by that of Victor Belle of Erôme (*département* of Drôme) in the Rhône valley which was in business from 1834 to 1930 (Jean-Léo 1971: 27, 25). The Musée de la Vie Wallonne at Liège in Belgium has a pipe marked "Gisclon/a Lille/D...P", and by extraordinary good fortune half a boxful of identically-marked pipes, still in their original packing - chopped straw and chaff - is in the Priest's House Museum, Wimborne Minster, Dorset (FIG 111) (at the beginning of this century the building was a tobacconist's shop and the box of Gisclon pipes, together with a half-filled crate of Southorn of Broseley pipes, was found in the attic when the building was being converted into a museum). Presumably this business was a branch or perhaps the original of the Montereau firm, but nothing further is known about it. In the Musée de Folklore at Tournai, just across the Belgian border from Lille, a pipe with "AURIOL" and "a PARIS" moulded on the stem sides has impressed on the top of the stem a shield with "Gisclon/Brévete [sic]/S.G.D.G./*", which suggests that a Gisclon took over Auriol or some moulds of that firm. A stem-fragment marked "néo/Culot/Gisclon/paris" from Lower Fort Garry, Manitoba, Canada, in the collections of the Research Division, National Historic Parks and Sites Branch, Ottawa (I. Walker 1971d: 34 pl 6 btm rt, 32 pl 5,7, 33, 31 - note that on p.31 Lille is inadvertently located in Belgium) also suggests there was a Gisclon working, or at any rate with a branch, in Paris.

A stem-fragment with NOEL raised from a depressed rectangular
ALYON
background was found with surface-material at the site of the Glen Airn Sawmill, 1842-1880s, on Big Creek nr Middleport ESE of Brantford, southern Ontario (T. Kenyon 1970); and at Fort Ridgely, Minnesota, occupied 1853 to 1861 and 1865 to 1867 a pipe with what appears to be the same form of mark on the underside of the stem almost under the bowl was found (Sackett 1943: 77, 74 p IV lower), Lyons (Lyon - *département* of Rhône) was noted as a pipemaking centre last century (quoted in Colas 1959: 235 and 1962: 32). Jean-Léo (1971: 26) notes that the firm of Noël Frères worked at Lyons from 1808 to ca.1920 and latterly also made brier pipes. About 1890 the firm along with some others became part of the Gambier concern (Jean-Léo *op. cit.* 35) but presumably continued to produce at Lyons; the mark "Noël Lyon" was used for home-destined products and "Noël/Paris" for oversea products, as noted above; this was possibly a piece of snob-appeal. Pipes with "Noël/Paris" sharply impressed on their stems are in the Musée du Tabac, Bergerac, and the Museum voor Volkskunde, Ghent; and with the

addition of FRANCE in a third line in the collections of the Smithsonian Institution, Washington. Pipes marked "Noël/Paris" with and without FRANCE are in the W.D. and H.O. Wills Collection, Bristol. (The addition of FRANCE to most of the French makers' marks seems common on the pipes found in North America, but only a single example - a Fiolet pipe in the Musée de la Vie Wallonne, Liège - has been observed in Continental collections. Continental material found in Britain is known marked in both forms (e.g. Atkinson 1958: 122 noting Fiolet pipes some with "France" after "St-Omer" and others with "Deposé" instead), though the crateful of Gisclon pipes at Wimborne Minster (see above) were not marked with their country of origin. Possibly it was added only where it was a legal requirement (cf Fontana *et al* 1962: 93; see also discussion in 4: IV), which it never was in Britain in the C19 (Department of Trade and Industry, London, *in litt.* 11 May 1972).

In 1659 the "*très haut et très puissant seigneur, monseigneur Eugène-Maurice, comte de Soissons*" obtained from the king the "*privilège de vendre, luy seul, tant èz ville et faubourgs de Paris que dans les autres villes du royaume, toutes les pippes qui servent à prendre le tabac et petun en fumée*", the monopoly to be held for nine years provided the pipes were not sold at more than 12 *sous* a dozen (quoted in Franklin 1906: 571). This suggests pipes were in widespread use by that date.

A pipemaker by the name of Vausselin was working at Avignon (Vaucluse) ca.1670, and in 1692 two brothers Pierre and François van Slaton were recorded making pipes there (Fresco-Corbu 1962: 1445, Jean-Léo 1971: 14) - presumably these latter two were Dutch, which suggests Dutch pipemakers spread widely in Europe. (Hendrickx (1963: 161) also mentions Vausselin and the van Slaton brothers, suggesting he is familiar either with Fresco-Corbu's article, or more probably with a source which the latter used; his version however, is that the Van Slatons established themselves at Avignon in 1592 and that they were followed by "French potters" such as Monelergeon and Vausselin.) Also in the south of France, a Louis Ragon was given the privilege in 1689 of establishing a pipe-factory and supplying pipes to most of SE France - Languedoc, Dauphiné, and Provence - for 15 years. He set up factories at Toulon (Var) and Tain, near Valence (Drôme), in 1689 but in 1691 his privileges were stopped because he was charging too much for his products (the appearance of the Van Slatons the next year may have been connected with this). However, in 1698 his privileges were renewed and Roussillon on the Spanish frontier included in the area within which he could market his products (Lesur 1957-60: 757, 1035, 1024).

At Troudoustein, near Morlaix (Finistère), Brittany, it is noted (Lesur 1957-60: 1052-3) that pipes were being produced in the C17 and up to ca.1736, when their production ceased.

At Arras, Lesur (1957-60: 1114) notes a pipemaker in 1743; ca.1770 a faience maker left Lille to set up business in Arras and there made pipes, although what type is not known. About 1850 an Ernest Gousseaume of Arras was making pipes said to be as renowned as those made at Saint-Omer.

An area which appears to have rivalled the north of France as a pipemaking centre, in quantity if not perhaps in fame, was Alsace-Lorraine, where pipemakers are recorded from the beginning of the C18 (Lesur 1957-60: *passim*). There were suitable clay deposits in the Strasbourg area and there were also the Westerwald clay deposits farther down the Rhine, in Germany (see 2: IX). A Dutchman, Charles-François Hannong, born in 1669 at Maastricht, set up as a pipemaker in 1709 at Strasbourg, and a number of other pipemakers, mainly with German names, appear there soon after (Lesur 1957-60: 1008, 1010).

A pipemaker who is said to have worked in north France during the period ca.1850-80 and whose products became famous enough to be both widely exported and widely plagiarized, but about whom virtually nothing is known, is Peter Dorni. His pipes, at least one variety of which appears to be characterized by a relatively upright Dutch-style bowl and a stem with heavy ribbing round it and the words PETER and DORNI on either side of the stem in rectangles, have been found in various parts of North America, and identical stems have also been found with variously PETER DORNI and IN GOUDA, J&G.PRINCE and IN GOUDA, ASPARNAAY and IN GOUDA, MÜLLENBACH and THEWALD.HÖHR, and I.G. PRENSE and IN GOTHA on their stems, indicating Dorni pipes were imitated by at least two Gouda firms and also by Müllenbach and Thewald of Höhr in the Westerwald in Germany and presumably by an unknown firm in Gotha in Germany. A 1900 list of pipe-types made in Scotland (Anonymous 1900: passim) shows that the Glasgow firm of Davidson produced a "Peter Dornie" (sic) pipe and that McDougall's of Glasgow produced four versions, two "Peter Dornie" pipes, a "Small Dornie", and a "Fluted Dornie". Unfortunately, no examples of these types are known. (Dorni pipes have been discussed in Omwake 1961: the writer is at present collecting information for an updated study, see also additional information on p. 683 n.81)

In the C19 pipemaking in France appears to have been widespread, from Brittany to Corsica and the north to Bordeaux (Lesur 1957-60: passim; cf Hendrickx 1963: 162 and Jean-Léo 1971: 23-31), but protracted correspondence has failed to ascertain definitely the present extent of the French clay pipe industry. There is conflicting evidence, and several firms which allegedly still make these pipes have not replied to letters sent - it is possible that some at least may be brier pipe makers. Two writers in the 1950s claimed that clay pipes were still being made in France: Hervieu (1951: 36) said they were being made in the départements of Gard - the area round Nîmes, at the mouth of the Rhône - and Nord, as well as "near Namur" (presumably Andenne) in Belgium and at Gouda in the Netherlands; Sauvage (1955: 26) talks of their production in Flanders and Provence.

At the end of 1967 a Joseph Augoyard restarted the old pipe factory of Job Clerc at Saint-Quentin-la-Poterie near Uzès in the département of Gard, which might agree with the two southern references in Hervieux and Sauvage; however, he closed ca.1969-70 and by the end of 1971 the factory was up for sale (Jean-Léo 1971:30; Lefrancq in litt. 9 October 1969, 19 January 1971, and 13 November 1971). Saint-Quentin-la-Poterie, as the name suggests, has a long pottery tradition (cf Lesur 1957-60: 932); Lefrancq (9 October 1969) notes that the village coat of arms is a vessel containing seven pipes, suggesting pipemaking also has a long tradition there. Clerc's business - "Manufacture de pipes en terres blanche, rouge, brune & noire" as an undated catalogue reproduced by Jean-Léo (1971: in end section of illustrations, no pagination) advertised it - went back to 1812 (Jean-Léo 1971: 30), and must at one time have been of some importance, for the catalogue noted above indicates "Fabrication spéciale pour les Colonies & l'Amérique du Sud". Augoyard produced bowls only, of an orange clay. At Marseilles

(Bouches-du-Rhône) the firm of Bonnaud was founded in 1824. Two sons of the founder continued the business as Bonnaud Frères, but apparently subsequently split to form the firms of Hippolyte Léon Bonnaud (who advertised "*Exigez les deux prénoms*") and Maison Bonnaud (who advertised "*Bonnaud sans prénom*"). The latter was still run by the Bonnaud family ca.1937, advertising itself modestly as "*La Plus Ancienne du Monde Entier*"; the former, continuing under the name of Hippolyte Léon Bonnaud but laterally run by the Gasquet family, was working as late as ca.1955 with three people, though in an intermittent fashion (Jean-Léo 1971: 27).[13] The Paris firm of Hermel made an unsuccessful attempt to sell pipe-bowls made on the Côte d'Azur, at Cannes or Nice (Alpes-Maritimes) (Jean-Léo *op. cit.* 28, second-last page of illustrations). At Vallauris, also in Alpes-Maritimes, a potter Marcel Giraud made in 1970-71 a de Gaulle and a Pompidou pipe, the 40 examples being exclusively for a Paris collector, a Mme Westphalen (Jean-Léo *op. cit.* 31, second-last page of illustrations).[14] The examples suggest that possibly SE France, rather than the NE, has become the last area in France where clay pipe making survives.

As noted in the preceding section, Lefrancq also indicates (*in litt.* 9 October 1969) a pipemaker named Petri still working at Schoten, near Antwerp in Belgium (see also 2: IX); and Van Hooneker (1971: 243; see also 2: III) records Frans van Overschelde continuing a Courtrai business at Kuurne ca.2 miles NE of that city, only a few miles from the French border, either or both of which may be the northern source vaguely indicated by Hervieux and Sauvage. Certainly clay pipes are still sold in France, for this writer saw examples with straight stems ca.9 ins long, in both white and a fine red clay, on sale in Bordeaux in April 1968; and the same or similar pipes were on sale in Saint-Omer in April 1969. They have no maker's mark; the red clay appears very similar in texture and colour to the Scouflaire red clay pipes noted above, and Lefrancq (*in litt.* 19 January 1971) notes that Scouflaire pipes are still on sale in places, though the factory closed in 1936 (Lefrancq 1970a).

Lefrancq also notes that Gambier pipes can still be obtained, and that a new French firm, possibly in Paris, called Le Nargileh, was pouring "Jacob" pipes on the market from an old Gambier mould. Herment (*in litt.* 21 March 1968) noted a firm, Maison Laville, at Montluçon (Allier) in central France who were producing Jacob pipes in a clay similar to that of Gambier pipes, but this writer has been unable to contact them by letter. (Jacob pipes were superbly-moulded bowls in the form of a patriarchal head with turban and full flowing beard made by Gambier last century and sometimes highlighted with coloured glazes. They were much copied by rival firms, to the extent that Gambier had JE SUIS LE VRAI JACOB moulded on a ribbon on the turban while rivals had variants such as JE SUIS JACOB, JE SUIS LE BON JACOB, JE SUIS LE GRAND JACOB, JE SUIS LE BEAU JACOB, JE SUIS LE VIEUX JACOB, IK BEN DE WARE JACOB, DEMANDEZ JACOB, or other wording such as L'EVEQUE ANCIENNE or L'UNION FAIT LA FORCE (some of these are noted in Jean-Léo 1971: unnumbered plate and caption in end section; see also Garreau 1972: 46-7 fig 13). Jean-Léo, who publishes the entire list of Gambier products and has many excellent illustrations, notes 15 sizes and models of Jacob pipes advertised by the firm; Fresco-Corbu (1962: 1446 fig 4, first and second left in upper row) illustrates two sizes of Jacob bowls, both of which appear to be genuine Gambier products.

Herment in his book Traité de la pipe (1956, 1965 ed) illustrates - pl 12 - a woman trimming clay pipes, but neither he (in litt. 21 March 1968) nor his publisher can offer any information as to where and when this picture was taken, although the credit for this and several other unrelated pictures is given to one R. Viollet.

SECTION VI: SWITZERLAND

The pipes formerly smoked in Switzerland - and, apparently, eastern France - are unusual in that they are of metal. Unfortunately, most incidental references to them, and the only study made of them (Reber 1914a; 1914b), have been by people convinced that they belonged to a period much earlier than the introduction of tobacco into Europe.

Only Godet (1898) really considers C17 and C18 evidence. From those illustrated (Reber 1914b: figs 1-IX; see also Quiquerez 1864: 30; 1871: pl IV 1-3; E.A. Barber 1880b: figs 1-10, 12-13; Lejeal 1897: 278 figs 1-3 - figs 2 and 3 being from eastern France - Godet 1898: 131 figs 2-7bis; McGuire 1899: 452 figs 72-3; Reber 1900: 167; and A.S. Brown 1923: 17) general typological similarities can be seen to Dutch pipes illustrated by Friederich (1964a: 11 fig 7; 1964d: 4). Reber makes no attempt at dating - other than to assert their high antiquity - nor does he attempt any typological arrangement. It is therefore unclear, particularly as the examples illustrated may have been only the most "interesting" specimens, how these pipes should be treated. There seems to be material which has similarities to later C17 Dutch material, and on very general stylistic grounds a number of pipes illustrated look as though they should be C18 in date. Among the features on pipes in this later group are heels with an expanded foot. This appears to be a German characteristic: some pipes made at present in the Westerwald have this feature and it appears both on German porcelain pipe-bowls (e.g. Fresco-Corbu 1963: 424-5) and on ordinary clay bowls (e.g. Gifford 1940: 129, 123 pl IV, 22; Sackett 1943: 30 pl VII, 1; Omwake and Becker 1965: 143-4) of last century, but there appears to be no firm dating as yet for its first appearance.

Several references (noted in Godet 1898: 132-3) indicate that iron, steel, copper, and brass pipes, as well as ones of boxwood and brass, were made and used in the Neuchâtel area in the mid-C18 and into the C19 but that by 1898 they had been out of use longer than the oldest inhabitants could remember. A reference in 1749 to a tax on "pipes de terre fine d'Hollande" suggests Dutch clay pipes were imported; some clay pipes are illustrated in some of the sources noted above and it is likely that the metal pipes evolved from clay prototypes. Metal pipes, being non-porous, would give a strong and hot smoke - their initial use may have been because there was no local pipeclay and pipes shipped up the Rhine were expensive and not always available, but once a taste for metal pipes had evolved, clay pipes may never have become popular. Duhamel du Monceau (1771: 2) mentions metal pipes but neither describes them nor says where they were used - iron pipes very similar to Swiss examples and with the same metal cap were being used in Sweden (Godet 1898: 131, fig 1), Norway, and Lapland (Pritchett 1890: 94-5; Lejeal 1897: 279-80, fig 8) as late as the end of last century.

Penn (1901: 37-8) says that tobacco first began to be smoked in Appenzfel canton in Switzerland in 1653 and that shortly afterwards laws were passed against smoking. As Appenzfel canton is in NE Switzerland this suggests German influence, especially as the Thirty Years' War of 1618-48 had spread the habit of smoking widely in central Europe (cf Quiquerez 1864: 31). In Berne in 1661 similar laws were passed and these were renewed in 1675 when the Chambre du Tabac, a court to try smoking offences, was instituted. This tribunal existed until the mid-C18. The first references to smoking in Neuchâtel appear in 1669 (Godet 1898: 132).

Corti (1930: passim, 1931 ed) agrees with a mid-and second half of the C17 date for the introduction of smoking into Switzerland. The tobacco plant was being grown in the country in the 1560s and 1570s in certain botanical gardens, but only for its medicinal use (Corti 1930: 61-2, 1931 ed), and by 1616 the medicinal use of snuff and smoking was known, though rare - one writer, praising the medicinal virtues of the herb, notes with astonishment that he had seen Englishmen smoking for six or seven hours without losing consciousness (Corti 1930: 121, 1931 ed). Even as late as the last decades of the C17, a Swiss visitor to England, one Muralt, could not get over seeing clergymen in London smoking clay pipes in inns and coffee-houses (Latimer 1900: 360).

Later in the first half of the C17, however, German tobacco-merchants and pedlars began to arrive - in 1643 one such merchant was refused permission to settle in Basle on the ground that "the town had no use for one of his trade" (quoted in Corti loc. cit.). In 1644 there were many local prohibitions, and by the early 1650s more widespread laws against smoking were passed. The struggle to enforce these laws continued until the beginning of the C18, when gradually the impracticability of enforcing them became obvious.

In the Musée du Tabac at Bergerac there is a lithograph by Charles Voght of a painting by H. Lenglet (probably Hilaire Langlet) of the Duchess of Berri, 1700, which shows her smoking a very long-stemmed clay pipe and has the caption "Souillant sa lèvre rose à la pipe des Suisses". Both Voght and Lenglet were C19 French artists, hence presumably the Victorian ring to the caption; but why the pipe depicted, which appears to be Dutch, should be referred to as Swiss is a problem which has not been solved.

The areas mentioned by Penn and those by Corti all lie in what can broadly be described as those open to German, and to a lesser extent French, influence, and it is in this area that all the metal pipes noted by Reber were found. This may indicate that smoking did not penetrate into southern Switzerland in early times, or at least not from the pipe-smoking northern areas.

(According to Penn (1901: 156-7) the pipe smoked by the Swiss at the end of the C19 was an unusual one. It comprised five separate parts: a bowl, which fitted into a hollow ball that acted as a reservoir for the tobacco juices, a metal lid "to prevent the Alpine winds scattering [the] contents," a stem which joins the ball at an acute angle, the mouthpiece which joins the stem at another angle, and a carved grotesque horse's head at the junction of mouthpiece and stem. The entire pipe was made of black horn and mounted with German silver - whether the bowl was of horn is not clear, but the presence of a reservoir suggests a non-porous material and a continuation of the tradition for a hot and strong smoke established by the metal pipes. However, Penn also notes that carved apple-wood pipes were made in Berne, and that they gave a very sweet and cool smoke, so presumably cool smoking was coming into favour by the end of the C19 - perhaps a reflection of the popularity of the brier pipes produced at Saint-Claude in France only a few miles from the Franco-Swiss border).

SECTION VII:
SCANDINAVIA

(Except where otherwise noted, the section on Sweden is based on Puktörne 1968, that on Norway on Pettersen and Alsvik 1944, and that on Denmark on Kristensen 1959. Puktörne's article appears (1968: 68) to be the first attempt in Scandinavia to use evidence from clay pipes to date archaeological contexts.)

Smoking was known in Scandinavia by the beginning of the C17 at the latest, for in 1606 an Anne Dirik Pipers of Helsingør (Elsinore), a port north of Copenhagen, left among other items in her estate a dozen tobacco pipes (Kristensen 1959: 82; Puktörne 1968: 63 and n.6). Whether her name indicates she was a pipemaker or the relative of one is not stated, but 14 years later a Kristian Pibemager, who may have been Dutch, is recorded setting up business in the same town (Friederich 1964a: 10). In 1612 a man called Anthionius and nicknamed "Tobakspiben" is mentioned in the minutes of a trial in Bergen in Norway (Puktörne 1968: 63 and n.6 and Kristensen 1959: 82 and n.2). These references indicate that pipes had reached Denmark-Norway (the two countries being at this time under one crown) by the early C17, and suggest that they were being made there considerably earlier than 1655, when the death of the first definitely-known Danish pipemaker is recorded - at Elsinore, where Anne Dirik Pipers lived 50 years previously (Kristensen 1959: 87, cf Oswald 1960a: 48). The earliest reference so far known to pipes in Sweden is a set of proposals for ship's articles dated 1628; a sealed find of a pipe in the sunken *Wasa* dates to the same year. (Many pipes were found during the excavation of the *Wasa* but most were later C17 and C18 according to the *Wasa* exhibition on show in Bristol in summer 1969 - the one pipe in this exhibition was Dutch and typologically datable to ca.1700). The earliest recorded reference to smoking tobacco in Sweden occurs in the following year, 1629, and it is clear from references in 1633 and 1635 that smoking was becoming widespread. That these initial references to pipes are connected with ports and ships is not coincidence - it seems very likely that the habit was initially introduced and spread by sailors as was the case in other countries (cf Corti 1930: 143, 1931 ed). In Denmark smoking spread during the first half of the C17, but it was the Swedish troops and mercenaries - particularly Germans and Poles - fighting during the Swedish Wars of 1643-45 and 1657-60 that appear to have made smoking widespread. A reference to snuff appears in 1637 (Kristensen 1959: 85). Swedish troops had been very prominent during the Thirty Years' War in Germany, which as already noted, was the major factor in making smoking universal in central Europe by the middle of the C17.

Laufer (1924b: 58) says that tobacco was first planted in Sweden in 1724; and by the mid-C18 there were tobacco-plantations, frequently associated with tobacco-spinning mills, in no fewer than 84 towns in Sweden-Finland (these two countries then being joined) - one such mill had been established at Varberg, on the Kattegat south of Göteborg (Gothenburg), in 1699. (Laufer also notes (*loc. cit.*) that tobacco was first introduced into Norway in 1616, but in view of the references already noted to a pipemaker in Bergen four years earlier it seems likely that tobacco was known earlier than 1616. Between 1632 and 1643 the importation of tobacco was prohibited in Norway; according to Laufer (loc. cit.) it was not until the period 1807-14 during the Napoleonic Wars that attempts were made to grow tobacco there. Its use had spread to northernmost Scandinavia by the second half of the C17, however, for it is recorded in 1674 (J. Schaffer's The History of Lapland (1674) p.116, quoted in Parsons 1964: 234 n.14) that the giving of tobacco as a pre-nuptial gift was an established custom there.

As noted in 2: V and VI dealing with pipe-manufacture in Denmark and Norway, native-made clay pipes were virtually non-existent in Scandinavia until the middle of the C18, when a protectionist policy towards native industry enabled pipemaking to achieve some temporary success. Prior to the mid-C18, pipes were imported from England and The Netherlands - there is some evidence to suggest that latterly the Dutch were outstripping the English. Helbers and Goedewaagen (1942: 19) note that ca.1760 - as indicated below foreign pipes were banned in Norway in January 1759 - 20,000 gross short-stemmed pipes were still being exported to Norway but that by 1789 the trade was virtually non-existent; however, the unpublished Gouda pipemakers' guild records indicate that the northern trade - presumably Scandinavia and the Baltic - was still a good market for the long-stemmed and best-quality pipes though it was difficult for Gouda makers to compete, partly because German-made pipes from the Rhineland and Stettin were plagiarizing Gouda marks and partly because these centres could produce at lower prices due to a lower standard of living. By this time, as is noted below, the native Scandinavian industries had largely sunk into obscurity, so presumably the market once more existed to be filled by foreign pipes; the major reason the Dutch were unable to regain it was therefore the widespread and cheaper German pipemaking industries.

Until the middle of the C18 the majority of pipes used in Norway were English or Dutch. The fact that Danish pipes, much more easily available and manufactured within the kingdom of Denmark-Norway, did not dominate the market as might have been expected no doubt indicates the superiority of English and Dutch pipes and the willingness of Norwegian smokers to pay more for them.

In 1751, however, Jacob Boy, a prosperous and well-travelled merchant and local minor official of Bragernes, Drammen, ca.20 miles SW of Oslo, applied for a royal licence to manufacture clay pipes. Taking advantage of the growing popularity in Scandinavian countries of a mercantilist policy (see also Sweden and Denmark below), Boy claimed that by manufacturing pipes he would be employing local labour and keeping money from leaving the country both by selling a native product and using local clay (from Blefjell in Telemark, SE of Drammen). In return he asked for a number of privileges, the chief being that he and his heirs should be given a 20-year licence, that foreign clay imported by him should be free of duties (an admission that the local clay was not going to be satisfactory), that if he found suitable employees locally he could exempt four from military service, that his licence be extended to cover all Norway when his factory was in full and successful operation, and that a large duty be placed on foreign pipes after he had proved himself able to supply the whole country. This would appear to be the first serious effort to make pipes in Norway.

The licence was approved with minor modifications in December 1751, at which time Boy was in Germany. The factory appears to have been producing soon afterwards however, for in June 1753 Boy is asking for the promised tax to be put on imported pipes. Almost immediately afterwards, however, Boy is asking for a complete ban on imported pipes in the local diocese. Citing the continued importing of pipes, his own pipe stock building up faster than it was being sold, the financial disaster to himself and his skilled foreign workers - brought in at great expense and some of them now married and with families - and to numerous local workmen if he could not make his venture a success, Boy followed this by asking for the ban to be extended to other dioceses and finally to the whole of Norway. (The reference to foreign workers, like the earlier one to foreign clay, indicates some of the difficulties of starting a native industry such as Boy was trying to do.) After considerable agitation Boy was successful and a total ban on the import of foreign pipes into Nowary was decreed in January 1759.

By this time another problem had arisen. Boy's licence, which he had originally asked to be for 20 years, had been reduced to one of ten years and this meant Boy would no longer have exclusive rights to pipe production after 1762. It appears, however, that Boy found supplying the farther-flung areas of Norway with pipes unprofitable and he expressed no desire to continue his monopoly to these places - quite the reverse in fact - but he was anxious to maintain his monopoly in the local diocese of Akerhus, noting that 50 people earned a living from his factory, 30 of them working there daily.

However, by this time the government was no longer so interested in industrial experiments and in assisting manufacturers and took no action on Boy's request, allowing one Kund Rist, who already had a monopoly to produce crucibles in Denmark-Norway, to expand into pipe-manufacture. By 1768 Rist was producing pipes at Hesvik near Drøbak, 18 miles south of Oslo and on the opposite side of the Oslo Fjord from Drammen, as a result Boy seems to have begun to lose interest in his pipe-factory and to have turned to other interests, though the ban on imported pipes continued. In 1766 there were a number of advertisements indicating the sale of the business together with all equipment and a house as an optional extra. The factory was noted as having steady workers. It was not sold, however, until 1770, and its subsequent history is obscure, though it was apparently still producing pipes as late as 1788, for a reference in that year mentions pipemaking at Kristiania (now Oslo), Moss (ca.35 miles south of Oslo), and Drammen. Another article of about this time refers to the Drammen industry as the remnant of a once-larger industry now employing only a man, a woman, and an apprentice. At this time the pipes were sold mainly in Denmark. At the time Pettersen was writing (ca.1940) an 89-year old descendant of one of Boy's pipemakers still lived in a house in the pipemaking quarter which was unchanged from the time of the pipemaking industry and which had formerly had an attic-full of pipes.

The pipes described from the excavation of Boy's factory reflect accurately contemporary English and Dutch styles, clearly indicating the imported models available to Norwegian smokers (Pettersen and Alsvik 1944: 31 and 33 - Dutch - and 35, 37, and 39 - English). As is noted below, the same holds good for Danish- and Swedish-made pipes of the same period. In 1767, a year after Boy had first advertised the sale of his business and presumably at a time when production had declined from that of earlier days, a catalogue listed 13 types of pipe made, two specifically called Dutch and four English. Excavations yielded approximately that number of recognizable types. Maker's marks used on the heel and base of Boy's pipes (ibid. 51) generally resembled Gouda-style marks, including the use of objects such as a hand or a sailing-boat. Marks were also placed on either side of the heel, as with English pipes of the period, although one mark, a shield surmounted by an inverted B may be a plagiarization of the Gouda coat of arms surmounted by an S used by Gouda makers to distinguish their "ordinary" quality pipes (see Section II above). One pipe found during the excavations (ibid. 31) had the Gouda arms, the letter S, and the saw-toothed rouletting stem decoration typical of Gouda pipes - it may have been a genuine Gouda pipe, either an example used by Boy for making copies or a casual find unrelated to the Boy factory. (Two C17 pipes of Dutch type (ibid. 29) were also found during the excavations). The most interesting marks used by Boy, however, were stem marks comprising bands of saw-toothed rouletting edged with the words JACOB BOY at one end and DRAMMEN at the other (ibid. 41), a precise immitation of a practice known in C18 and C19 Gouda (Wylie 1968: 24-7, fig 19b; Humphrey 1969: 20, 19 fig 13c); and the use of the famous TD motif on the bowl facing the smoker as in English pipes from ca.1755 to ca.1800 (I. Walker 1966a) but with the letters IB for TD (Pettersen and Alsvik 1944: 41). Glazing of the mouthpiece - with a blue glaze - occurs on some specimens (ibid. 47), and the 1767 price-list has one style - English - with a blue-glazed mouthpiece.

An inspection in 1754 recorded Boy's factory had a master, five journeymen, four apprentices, six young women, and two labourers. The labourers sorted and cleaned the clay and did general daily chores; the trainees made the rolls; the journeymen moulded them; while the women trimmed, polished, and marked the pipes. The journeymen, who were paid piece-rate, appear to have been foreigners judging by their names - some of which are probaby Dutch - and were able to mould six gross normal-sized pipes each a day. (This is almost double British production rates, but the British figures are based on the entire manufacturing cycle, not just the moulding - it still, however, represents half a gross an hour if a 12-hr day was worked, or over one a minute). The five journeymen thus produced 180 gross pipes a week or upwards of 9,000 gross in a year. In addition, the four apprentices worked under contract for a fixed wage for a number of years and after the first year were said to be as good as the journeymen, so that with their production added, the kiln, which held 380-1/2 gross normal-sized pipes, could be fired once a week. The master appears to have been responsible for overseeing the work of the factory.

Boy's chief problem was that even with his monopoly to sell pipes throughout Norway it was not financially practical for him to sell them in centres where expensive transportation was needed - Trondheim, Bergen, and Kristiansand, for example. Consequently he was unable to sell enough to justify his ambitious production programme. His large staff contrasts markedly with the man, woman, and apprentice noted earlier carrying on the remnants of his business in 1788; indeed in 1790 there is a reference

(Minchinton (ed) 1957: 62) to Bristol pipes being shipped to Langesund ca.60 miles SSW of Drammen (see also 6: VIII (a)(2).)

Some details of the manufacturing techniques used are also given in Pettersen and Alsvik; these are described in 2: V.

There had been unsuccessful attempts to set up a pipemaking industry in Stockholm in the C17, where among others two Dutchmen had been granted privileges in 1650, but the Swedish market for pipes was met almost exclusively by imports from England and The Netherlands until the middle of the C18, when a ban on imported pipes enabled Swedish makers to have some success.

In 1638 the Swedes colonized New Sweden (the present Delaware and southern New Jersey) and amongst their cargo loaded at Gothenburg (Göteborg) was tobacco-pipes. This settlement was actually organized by Dutchmen for the New Sweden Company, the former having been instructed to buy goods suitable for trade from The Netherlands (Omwake n.d.: 8, citing C. Ward's *The Dutch and Swedes on the Delaware* 1930, p.86) so that there is little doubt the pipes listed would have been Dutch.

In the middle of the C17 the Swedish poet Georg Stiernhielm in his poem *Hercules*, written ca.1647 and published in 1658, talks of the "chalky white pipes of Brabant," which probably refers to Dutch pipes. One pipe which is certainly Dutch and datable to the later C17 (cf Friederich 1964c: 61 fig 3; 1964d: 4; Pratt *in litt.* 25 January 1968) is illustrated by Puktorne (p.65 fig 1a). (The term *kritpipor*, chalk pipes, is the Swedish for clay pipes, but it is not a term of great antiquity, for C17 and C18 customs-documents usually call them simply tobacco-pipes. The term *kritpipor* refers entirely to their colour, not to their composition. Similarly, the analagous Danish term *kridtpiber* does not appear until the beginning of the C19, the terms "tobacco-pipe" or "clay pipe" being used before that time (Kristensen 1959: 80). The Norwegian term is *krittpiper*. In fact red and black clay pipes - of unspecified date - have been found in Sweden at Varberg and at Halmstad, a port south of Varberg (Puktörne 1968: 64 and n.8).)

A duty on imported pipes is recorded in 1639, but with the exception of the year 1685 import figures for pipes are available only from 1718 until 1748, the year after the Swedish government's ban on importing pipes, and even then figures are not available for every year. Further, the breakdown of these figures into English and Dutch imports is available only from 1738. With the exception of 1720, in which year over 14,000 gross pipes were imported, the amount varies between 5,000 and 10,000 gross up to and including 1741. In 1742 there is a drastic reduction to 525 1/3 gross, and though the figure climbs to between 1,100 and 2,100 gross in succeeding years the market is closed by a decree of 6 November 1747 and the last import figures record two gross Dutch pipes arriving in 1748.

Puktörne gives no explanation for the reduction in imports in 1742 and following years, but it seems likely that a heavy duty was imposed on imported pipes at the beginning of that year. From 1738 to 1742 English pipes are imported in approximately twice the amount that Dutch pipes were, but from 1743 to 1748 there is a marked preponderence, proportionately speaking, of Dutch pipes, and from this it seems possible that the presumed duty imposed in 1742 affected the importation of English pipes more adversely than it affected that of Dutch pipes. (The period from 1738 to the outbreak of the Seven Years' War in 1756 was one of steadily-worsening relations between Britain and Sweden, the British representative in Stockholm being withdrawn in 1741 and again in 1748. During the first half of the C18 there was also in Sweden a growing policy of mercantilism - touched on by Puktörne p.74. The uncertain trading-relations between Britain and Sweden during this period are discussed, with reference to the trade from Sweden in iron-ore, by Ashton (1924: 108-21, 1963 ed).)

The figures for the period 1738-47 also indicate that there was a small - only three times over 100 gross - but persistent importation of pipes from a source or sources other than England and The Netherlands. These pipes may have come from north France, but more probably from Germany - as already noted, the Gouda trade with Norway and Hamburg was almost entirely killed between ca.1760 and ca.1790 by the expansion of the German pipe industries.

In 1746 a pipe industry was set up at Nolhaga, on the outskirts of Alingsås NE of Gothenburg, employing 79 workers; and this factory and one in Stockholm were the only pipe-factories in Sweden in 1747, the year in which the ban on imported pipes was passed (Puktörne pp76-7 says 1757 but this appears to be a misprint). Not surprisingly, the ban on foreign pipes stimulated home production, and by 1755 there were four factories in Stockholm and the one at Alingsås; by 1758 the total had risen to 11. As well as the five mentioned previously there were two at Norrköping (SW of Stockholm) and one each at Falun (NW of Stockholm), Arboga (west of Stockholm), Karlskrona (on the south Baltic coast), and Varberg (south of Gothenburg), of these six were founded in 1757 and 1758.

The factory at Varberg was set up in 1756 partly because it was said that the pipes sent to Varberg - from Alingsås, some 80 miles away - had to come mostly by land and that as a result the greater part of the shipments arrived broken and damaged. The factory, which was built on the outskirts of the town to reduce fire danger, was not, however, a successful venture, and ceased production sometime between 1770 and 1783. Figures for the years 1758 to 1764 inclusive and for 1766 indicate an extremely low production - only in 1764 when 2,000 gross were made and in 1766 when 1,700 gross were made did the annual figure exceed 1,500 gross - otherwise the annual output was between 1,000 and 1,500 gross. The staff comprised the *bruksmästare* (factory-manager) or *pipomakare* (pipemaker), a "pipemaker's apprentice" and a total of about 10 others formed of varying proportions of "trainees", "others", and "boys and womenfolk". The "apprentice" appears to have been more of an assistant manager or pipemaker; the others must have comprised rollers, moulders, trimmers, and general helpers such as packers. Considering Houghton, talking of English pipemakers working at the end of the C17, noted that six workers - presumably the staff of a small business - could produce 60 gross pipes a week, even 2,000 gross a year is a low production rate for the size of staff involved at Varberg, for that yearly figure gives a weekly rate of ca.48 gross. No information is given as to possible sources for the clay used by Swedish pipemakers, but Puktörne notes that the clay of the Varberg pipes was much coarser than that of the Gouda pipes found during excavations at the fortress of Varberg and that this led to difficulties in moulding and a much less evenly-finished product.

Despite the initial spread of pipe-factories in Sweden following 1747 it appears that as an industry pipemaking was not successful, though pipes appear to have been sporadically produced until the end of the C19. As noted when dealing with Swiss metal pipes, iron pipes were being used in Sweden (Godet 1898: 131, fig 1), Norway, and Lapland (Lejeal 1897: 279-80, fig 8) as late as the ends of last century, but it is not clear whether they were commonly used or a local product made in remote areas.

The pipes produced at Alingsås and Varberg are interesting in that their bowl shape (FIG 129) is a direct copy of Oswald's London-Home Counties type 9 bowl shape. Their makers' marks also have affinities to those of English makers, for they incorporate the initials of the factory-manager or pipemaker, something which is almost never recorded at Gouda though it was standard practice among English makers. According to Puktörne, these marks occur "on the side of the bowl, above where it joins the stem", but his illustrations do not indicate precisely where. Some Dutch pipes seen by this writer have their mark on the side of the bowl almost at the base; if, however, the mark occurs higher up the bowl side it could be similar to the distinctive Bristol mark where the maker's name or initials occur in a cartouche, a form which first appears in Bristol at the end of the C17 and is particularly popular during the first half of the C18 (see Appendix IX *passim*; cf also discussion in 6: VII(a)(2)). The pipes most commonly made at Varberg appear to have been what is called the "smaller sort" and had a stem length of about four ins. The decoration on these stems were bands of slightly wedge-shaped dashes lying parallel to the line of the stem and encircling it, and encircling bands of open contiguous dots. This type of decoration appears to be Dutch-derived (for a discussion of English and Dutch stem decoration see I. Walker 1971c: 82-5).

From the evidence of the pipes made in these two Swedish centres it seems likely that English pipes had a greater influence in determining Swedish taste than did Dutch, for the English bowl shape was adopted in preference to the Dutch. This suggests English pipes reached Sweden in greater numbers than did Dutch pipes, and it is thus likely that the import figures for the period 1738-42 which indicate during that time approximately double the number of English pipes to Dutch represent the import trend for a considerable time previously. London and the East Coast ports would be the obvious places to ship pipes to Sweden and the bowl shape adopted by the Swedes, as noted above is a London-area form, but in view of Bristol's Baltic trade (see 6: VII(b)(1) it is possible Bristol pipes reached Sweden - Bristol pipes were reaching Norway in 1790 (see above, also 6: VII(b)(2).

As already noted, there is evidence that tobacco was being smoked and pipes being made in Denmark from early in the C17, and that by the mid-C17 smoking was widespread.

It is not until the middle of the C18, however, that a native pipemaking industry begins to emerge. The first known pipe-factory, and the only one recorded during the second half of the C17, was in Copenhagen, and though its owner was granted a monopoly to supply all of Denmark and Norway the business lasted only from 1672 to ca.1675. Most pipes used in Denmark prior to ca.1750 were imported, in earlier times from England and latterly from The Netherlands. Pipes were also imported from Norway (see above). English pipes of mid-C17 date have been found (Kristensen p.89 fig 4 - they are slightly earlier than the caption indicates), and an engraving of 1762 (Kristensen p.81 fig 2) shows an example of Oswald's type 9.

From ca.1740 onwards, however, a number of pipe-factories were set up, some of them by foreigners. A Salomon Burton, an Englishman, set up a factory in 1747 in Copenhagen and was joined in 1751 by a Peter Appleby. Appleby was actually a ropemaker who joined Burton only for a short time to help him get his business going; Burton produced in Copenhagen typical London-style bowls of Atkinson-Oswald type 25 - the London variant of Oswald's type 9 form - with typical London marking of his initials one on either side of the base, upright (Atkinson in litt. 11 April 1972). (A Walter Burton pipemaker died in London in 1665 (Oswald 1960a: 62), but no reference is noted to a Burton working in England in the mid-C18.)

In 1762 one Johan Cornelius Rømer came to Denmark from Muhlhausen in Germany and became master-pipemaker at the factory established that year by the Grocers of Copenhagen, leaving it two years later to start his own business in the same city. Unfortunately, it is not known from which Muhlhausen in Germany Rømer came: there are at least three - a small town NNE of Nürnberg (Nuremberg) in northern Bavaria, a small town west of Elbing in East Prussia, and a much larger town NW of Erfurt in Thuringia, East Germany. None of these is near the Westerwald nor any other known German centre for clay pipe production. (There is also Mülhausen, the town now known as Mulhouse in southern Alsace, which however had been French since 1648. Northern Alsace, which became French in 1681, was a pipemaking area by this time, using local deposits of clay (Section V above, also 2: IX).) Between 1749 and 1768 there were various short-lived attempts to assist the growth of the Danish industry by prohibiting, or limiting by custom duties, the importation of pipes, but this never became completly prohibited as it did in Sweden at this time.

A major problem for Danish pipemakers was that imported pipes, particularly Dutch, were of such a high quality and had established such a reputation that it was difficult to match them. Further, there was a dearth of good-quality clay, which as a result had to be imported from England to The Netherlands. However, the Danish island of Bornholm in the Baltic did have deposits of a superior clay, (cf Howe 1914: 75-7), and in 1753 a maker proposed to establish a pipe-factory at Odense using this clay. Later, in 1791, an Englishman James Davenport set up a pottery and pipe-factory on Bornholm (cf Mankowitz and Haggar 1957: 297) where Davenport is noted as working in 1789 producing cream-coloured earthenware; it is not known whether this James Davenport was a relative of the famous English family of pottery manufacturers of this name - he appears slightly earlier than that family's rise to prominence from 1793 onwards (Mankowitz and Haggar 1957: 67).) (Pettersen and Alsvik (1944: 38) mention that although there is no evidence that Boy's pipe-factory at Drammen, Norway, imported its clay from Bornholm, a later-established Norwegian factory - whether a pipe-factory or not is not stated - used Bornholm clay. This must have occurred towards 1800.) That pipemakers in Denmark had mastered the technical aspects of making good clay pipes is suggested by the variety of sizes they were able to produce in the second half of the C18 - by 1762 pipes with a stem length of 30 ins if not longer were being produced.

About 1772 Johan Adolph Rømer, son and apprentice of the Johan Cornelius Rømer noted above and like him, born at Mühlhausen, opened a pipe-factory at Nørresundby, where a local deposit of "blue" clay was useful for saggars and kilnware. The factory continued into the C19 but appears to have been closed by 1813, and the building remained standing, though somewhat altered, until becoming derelict in the 1950s. Prior to the building of a modern housing complex on the site in 1958 an archaeological and architectural examination was made and evidence for the types of pipe made and of the firing methods used was found.

Thirty-four different styles of pipe-bowls were recovered, 17 being in the Dutch style, 7 in the English, and 10 in a mixed style. The excavator believes still more styles must have existed. Five of the bowls - all in the Dutch style - were plain; the rest were ornamented, either in the form of effigy pipes with the face towards the smoker or with fluting or with scroll decoration. The pipes came with and without heels and spurs. All the English- and mixed-style bowls had spurs; the Dutch-style bowls had heels or spurs, or neither. The spurred types, with one exception, had A and R on either side of the spur; the exception had three dots on one side. One type with neither heel nor spur had A and R on either side of the bowl. Of those with heels, some had no mark, some a star on the base of the heel, some a 7 inside a C (apparently standing for Christian VII), some AR on one side of the heel with a motif of dots and small circles on the other. Ornamented stems were also found, some stamped I.A. RØMER NØRESUNDBY or simply NØRESUNDBY (in the inscription the town is spelt with one "r" and the "ø" in both the place- and maker's name has the slash angled in the opposite direction to that shown here). It is interesting that Rømer should have been producing so many ornamented pipes before 1800, for it is in line with the evidence (noted in 1: II(h)) that similarly-decorated pipes were appearing in England from ca.1780 and in The Netherlands from before 1771 (Rømer's pipe styles are illustrated in Kristensen figs 19-25).

Rømer also produced glazed pipes, with stub stems ca.1-1/2 ins long to which was presumably fitted a wooden stem. The glazes used were produced in a number of shades of green, blue, and brown. In Rømer's case at least, such pipes do not appear to have been glazed in order to disguise inferior clays used, for his glazed pipes were more expensive than his unglazed.

In 1776 there were monthly firings, giving an annual production of 1,000-1,200 gross pipes a year; later there were more frequent firings, and production in 1802 was up to 5,000-6,000 gross a year. The 1787 census listed the following at the factory: Rømer, his wife and daughter, his father Johan Cornelius Rømer noted earlier as a pipemaker, his stepmother, and six servants, one of whom was listed as a journeyman. How many of the servants other than the journeyman were associated with the manufacture of pipes is not stated, but presumably one or two were, and probably the father and other members of the family assisted in some way. The production figures given, however, do not suggest a large business. One thousand two hundred gross pipes a year is ca.23 gross a week or just under 4 gross a day. On the evidence of British production, the average daily output of a single moulder plus a trimmer was three to three-and-a-half gross a day, which suggests Kømer had at the most two moulders working. This in turn would suggest one trimmer, probably a woman (the usual proportion of trimmers to moulders being one to two), and one or two men to prepare the clay and load and unload the saggars and put them in the kiln, and probably another woman to pack the pipes for shipment. Six thousand gross a year is ca.115 gross a week or just under 20 gross a day, which suggests possibly six moulders were employed. This would suggest about three trimmers, and the usual extras to prepare clay, supervise the firing, and do the packing. The two sets of production figures are for 1776 and 1802 respectively, while the census figures are for 1787: by 1787 production was probably about the same or perhaps a little higher than that recorded in 1776, for the size of the household in 1787, assuming most of those listed were involved in pipe production, would indicate this; on the other hand, the production figures for 1802 suggest that there must have been a larger household by that time.

In 1796 it was estimated from trade figures that between one and four dozen pipes were used per year by people in Denmark or one to four pipes a month - as English figures for the beginning of the C18 (see 1: I) suggest that a smoker used three or four pipes a week, the Danish figures either indicate less pipe-smoking in Denmark than in England or else a gross average obtained by dividing the number of pipes produced by the adult, or perhaps entire, population.

SECTION VIII:
UNITED STATES OF AMERICA

As noted in Section III above, the East-Central European tradition of the stub-stemmed earthenware pipe, probably deriving in the first half of the C17 from Turkish originals, came to North America with the "Moravian" settlers who established themselves at Bethabara, North Carolina, in the early 1750s and there produced this form of pipe for over 100 years, leaving indeed a tradition of their manufacture which is not yet completely dead in that area.

The spread of stub-stemmed pottery pipes throughout the United States as a distinctively American style of pipe had not yet been studied in any detail, though this writer attempted a preliminary overview (I. Walker 1971a) in which a spread from a Bethabara origin was tentatively suggested, a suggestion which subsequent evidence (see 2: VIII) would now alter. It seems at least likely that a presumably indigenous development of the pipe-form had occurred among white settlers in the Pamplin area of Virginia before the 1740s, some two decades before Gottfried Aust came from Upper Saxony to settle at Bethabara as the town's potter and pipemaker in 1755. Further, Aust had worked at the pottery at Bethlehem in Pennsylvania, a Moravian settlement dating from 1741, for ca.10 months in 1754-55 before going to Bethabara, and while no work has been done on Pennsylvanian Moravian pipes, stub-stemmed pipes were definitely being produced in the Pennsylvania Deutch area of Bucks County, immediately SE of Bethlehem, at one time. Certainly, if the stub-stemmed pipes found at Hanna's Town immediately north of Greensburg in SW Pennsylvania, 25 miles ESE of Pittsburg and almost 250 miles west of Bucks County (Mary L. Fields, "Sifting the Ashes for Hanna's Town", paper presented at the spring 1972 symposium of the Council for Northeast Historical Archaeology, Bear Mountain, New York state), do belong to the period of that settlement, they must have been available to settlers in that area of Pennsylvania by the last quarter of the C18, for Hanna's Town was founded in 1773 on a site where there was already a tavern and one or two houses, and after 1787, when Greensburg became the county seat, it gradually became farmland (see also Grimm 1972). Certainly, in the early C19 German settlers from the Bucks County area moved to Ohio where pottery was being made in the Akron area by 1828 and stub-stemmed pipes were being factory-produced by the mid-1840s (C.D. Blair 1965: 2-3). Immediately before 1880 an Akron, Ohio, firm, the Akron Smoking Pipe Company (see p.209 above) set up a subsidiary in Pamplin and also had another factory in Virginia, at Hampton. Much farther north, in Massachusetts, a Shaker community was producing this form of pipe by 1795 (L.W. Watkins 1950: 93); another Akron firm, H.J. Ayres and Company, advertised on their billheads of the 1870s that they manufactured "Wood, Clay and Enameled Smoking Pipes; Also, All Styles of Shaker Pipes" (C.D. Blair 1965: 30 illus), but no description is given of these last.

From this widespread eastern United States base, stub-stemmed pipes followed the opening of the American Mid-West and West. They are known from Michigan, Indiana, Illinois, Kentucky, Mississippi, Louisiana, Minnesota, Arkansas, North Dakota, South Dakota, Nebraska, Oklahoma, Montana, Idaho, Wyoming, Colorado, New Mexico, Washington state, Oregon, and California; and they were certainly being made last century in Texas. In the East, they have been recorded from New York state, New Jersey, Maryland, Georgia, and Florida; they have also been found at the other end of the continent, in Alaska (for a list of sites see I. Walker 1971a: 29-31 and refs, to which should be added Quimby 1942; Bullen and Bullen 1945; VanStone 1955; Lenik 1965; 1967a; J.P. Wilson 1967; M.L. Wilson 1968; Heite and Batte 1968; Cresthull 1969; R.L. Wilson 1971; Kelso 1971; MacCord 1971; Thomas and Burnett 1972; Michael 1972; Hamilton and Hamilton 1972; Bray 1972; Murphy and Reich 1973; Moore and Stinson 1973; Brose and Essenpreis 1973; Wray 1973; C.S. Bartlett 1974; Petsche 1974; Chance and Chance 1974; Murphy 1974; Fairbanks 1974; Hoffman and Ross 1974b; 1974c; Ferguson 1975b; also Hagerty *in litt.* 27 January 1969 referring to finds at Fall Brook, Geneseo, 27 miles SSW of Rochester, NW New York state (same site as in Wray 1973 above) and at Brewerton, at the west end of Oneida Lake, 13 miles north of Syracuse, upper New York state; Zimmerman *in litt.* 14 March, 13 September, 12 November, and 25 November 1974 referring to two examples from northern New Jersey bearing the name J.M. WATKINS on the rt side of the stub stem; and Mary L. Fields, "Sifting the Ashes for Hanna's Town" (see above), paper presented at the spring 1972 symposium of the Council for Northeast Historical Archaeology, Bear Mountain, New York state) (with reference to the Watkins-marked pipe, it is almost unknown for stub-stemmed pipes to carry names; the only other examples known to this writer are one with LEWIS on one side of the stem and CASS on the other side from Fort Vancouver, Washington state (Caywood 1955a: 59, 60 fig 16 "knobby" pipe btm centre but not shown with names), and some manufactured by the Akron Smoking Pipe Company of Ohio (see p. 209 above) with FINZER on two of the six facets of a stub stem (Murphy 1974: 248). However, the letters N and D on the left and right sides of a bowl from the Point Pleasant kiln-site and another with the same letters but on opposite sides of the bowl (probably a mouldmaker's error) no doubt refer to Nathan Davis, one of the owners of the Point Pleasant kiln (Thomas and Burnett 1972: 28 fig 8-i, SP-2 and SP-3; 8, 6-7). A third initialled bowl from the Point Pleasant site bore uncertain letters, possibly T and J or J and T, on its sides, but these could not be identified with any known owner of or worker at the site (Thomas and Burnett 1972: 28 fig 8-i, SP-1; 8).)

Some of these finds are definitely of Pamplin-made pipes and others probably are (cf Hamilton and Hamilton 1972: *passim*, esp. pp5, 6 and refs; also Humphrey 1969: 25, 24 fig 28; see also pp 205-6 above). Thomas and Burnett in their report on the Point Pleasant kiln-site in extreme southern Ohio (Thomas and Burnett 1972: 12-13 and refs) have identified probable Point Pleasant pipes widely in the western states (cf also Humphrey 1969: 24 fig 27 and Thomas and Burnett 1972: 27 fig 8-h examples PL-4 and PL-5). Two stub-stemmed pipes from Fort Union, New Mexico, illustrated by R.L. Wilson (1966) have been identified as products of the Akron Smoking Pipe Company of Ohio (Murphy 1974: 248) (Murphy also identifies five Fort Union pipes with Point Pleasant types, and notes that at least seven others are closely related to Point Pleasant types - his Point Pleasant site, though identified with the Akron Smoking Pipe Company's site, may however be the same as

Thomas and Burnett's site, though he is apparently unaware of the latters' investigation and report).[15]

Identifiable Bethabara pipes, on the other hand, are rare so far: at one time they certainly formed part of a major trade both to Indians and to white settlers in the eastern United States (Bivins 1972: 174; South 1965: 49; Albright 1958: 18) - reed pipe-stems were being sent from Bethabara as far as Philadelphia at the beginning of the C19, which suggests Bethabara pipes must also have been traded that far - but there are no records of the distribution of these pipes. MacCord (1971: 104) notes a fragment of a possible example from the Lipes site in western Virginia, ca.23 miles NNE of Roanoke, but otherwise the only occurences in archaeological contexts known to this writer of what are almost certainly Bethabara pipes is one from the Fall Brook site at Geneseo, upper New York state (Wray 1973: fig 15-6) and a whole example and fragments of several more from the underwater excavations carried out recently by the Research Division of the National Historic Parks and Sites Branch in Ottawa on a French supply-ship, the Machault, in the Baie des Chaleurs on the Quebec-New Brunswick border in Canada (in Research Division's collections in Ottawa). The Fall Brook site is dated by Wray to ca.1750-79, while the Machault was sunk in 1760: if the pipes are indeed Bethabara-made, these dates would indicate they were certainly products of Aust; and their excellent-quality moulding and extreme similarity to the Aust products illustrated by South leave little doubt as to their Bethabara origin. The Fall Brook site pipe can most easily be explained as having come by trade from one of the northern centres to which Bethabara pipes were traded; those from the Machault raise more intriguing problems, for the ship was en route to Montreal in an attempt to relieve the beleaguered French forces there - pending further research on the ship's cargo and previous ports of call, a possible explanation is that the ship or some of its crew had been in a southern American Colonial port.

Certainly, in the years following Aust's arrival in Bethabara in 1755, his pottery was widely traded, including at Charleston, a prominent Colonial port. Further, in 1807 a slaver leaving Charleston for the Congo included in her cargo "1 Box Pipes" (Donnan (ed) 1935: 567): the type of pipe is not stated and certainly a manuscript account of New England legitimate trade with West Africa at the beginning of the C19 lists English and Dutch pipes among the New England trade goods (G.E. Brooks 1970: 329, 334), but it is at least possible that pipes shipped from Charleston would have been local American stub-stemmed types rather than conventional European white clay pipes. Parenthetically, it may be noted that the American stub-stemmed pottery pipe might have been particularly acceptable to West Africans, whose own native pipes were stub-stemmed, usually decorated and certainly in the earlier examples painted, and of earthenware (e.g. Shinnie and Ozanne 1962: 99-103, figs 6-10; Ozanne 1963: 55-57, figs 1-3; York 1973: 35-43, figs 15-23 and Ozanne and York 1974: 199; Connah 1975: 179-80, 162 fig 49; cf also remark quoted in G.E. Brooks 1970: 92 n.25 that Africans, finding the European pipes too small, made most of their own pipes with extremely large bowls - the manuscript account of New England trade referred to above and dating to the beginning of the C19 lists at one point (Brooks op. cit. 324) "Pipes Common short, with large bowles").

Apart from the Machault pipes almost certainly made by Aust, only six

Canadian sites known to this writer have produced stub-stemmed pottery pipes, and these only rarely; and certainly for three of the sites there is sound historical evidence to suggest the pipes reflect contacts from the United States.

As two of the sites - an Hivernant-Métis site of the third quarter of the C19 in the Cypress Hills of extreme SE Alberta, where fragments of two such pipes were recovered (J. Elliott 1972); and Fort Walsh, 1875-83, also in the Cypress Hills but in extreme SW Saskatchewan, where the stem of one example and a probable bowl fragment was recovered in the 1973 excavations conducted by the Research Division of the National Historic Parks and Sites Branch - other archaeological evidence also indicated United States contacts and historical data showed the sites had been supplied through Fort Benton, ca.180 miles SSE in Montana. In fact, both major American trading-companies of the period, I.G. Baker and T.C. Power, established permanent stores at Fort Walsh, for until the trans-continental Canadian Pacific Railway reached the Canadian Prairies supplies for that region from eastern Canada had to be shipped through the United States (for the history of Fort Walsh see McLeod 1969).

At the third site, Lower Fort Garry in Manitoba, a Hudson's Bay Company post 20 miles NE of Winnipeg founded in 1830, where part of a bowl of a stub-stemmed pipe of a type also found at Fort Vancouver, Washington state, another Hudson's Bay post (Caywood 1955a: 59, fig 16 2nd btm line 2nd example from left labelled "knobby" pipe; Hoffman and Ross 1974c: 50), was found (in collections of the Reseach Division, National Historic Parks and Sites Branch, Ottawa), the sitation is essentially the same: the route north up the Mississippi and down the Red River of the North from St Paul in Minnesota offered substantial practical advantages - including a railway from 1878 connecting Winnipeg to the United States - than did any pre-Canadian Pacific Railway alternatives in Canada (for Lower Fort Garry historical background see D. Miquelon 1970).

At the fourth site, Fort Coteau-du-Lac, Quebec province, on the St Lawrence ten miles from the Ontario border, a stub-stem fragment was found during excavations by the Research Division of the National Historic Parks and Sites Branch in 1965-66. Fort Coteau-du-Lac was founded in 1779 and the military establishment there ended in 1851; the context of the pipe-fragment is unknown, but as the fort was built to defend a canal designed to circumvent the rapids on the St Lawrence here and as the canal remained the only way of taking goods upriver beyond this point until the Beauharnois Canal was completed in 1845, it is extremely likely the pipe-fragment came from an American traveller on the river; in addition, the Fort itself is only ca.20 miles from the American border (for brief accounts of the Fort Coteau-du-Lac excavations see Rick 1970; Folan and Ingram 1973).

At the fifth site, the Deadman site ca.35 miles west of Kamloops in British Columbia, most of an unusual stub-stemmed pipe, glazed and with a grotesque face, was found, and while little other artefact material was recovered from the site a date of ca.1860 has been suggested by the excavators (Miss L. Robinson in litt. 8 and 20 February 1974); and it is at least possible this pipe also represents the penetration of American trade north into Canada prior to the completion of the Canadian Pacific Railway in

1885 which tied the country together and allowed Canadian goods to flow west without being shipped through the United States for much of the route.

The sixth site is the Ermatinger House at Sault Ste. Marie, Ontario, on the St Marys River between Lakes Superior and Huron. The house was built in 1814, replacing the original structure of 1804, and was continuously occupied, apart from a short break in the 1830s, until 1967, when it was purchased by the Sault Ste. Marie Historic Sites Board. Excavations in 1974 produced almost a thousand clay pipe fragments, including two examples of plain stub-stemmed pipes of tan-coloured clay. Sault Ste. Marie is directly across the river from the town of the same name in Michigan, so that the occurence of a stub-stemmed American pipe at the Ermatinger House should occasion no surprise - C.O. Ermatinger, who built the house, was a trader first for the North-West Company and later for the Hudson's Bay Company (Reid *in litt.* 14 October 1974 and in conversation).

Through the kindness of Harold Zimmerman of the Friends of the Hermitage Archaeological Work Team (see Bibliography - Personal Communications) the writer received (at the spring 1975 conference of the Council for Northeast Historical Archaeology held at Bear Mountain, New York state) a stub-stemmed earthenware pipe made in Haiti. The pipe is of a pleasing polished brick-red colour and appears to have been made without the use of a mould; broad smoothing marks suggesting shaping with a blade are visible. The opening through the stub stem has been made by inserting a pointed tool about the size of a large pencil. The bowl opening may have been either scooped out with some tool or fashioned with a plunger type of tool; in any event, it has been relatively roughly finished off by inserting some tool and partly turning it, and the bottom of the bowl opening shows the use of some pointed object. Apart from its polish, the pipe is decorated with two incised lines, one round the mouth of the bowl and the other round the end of the stub stem, and three bands of miniature knurling decoration - giving an appearance similar to the surface of a file - one running along each side of the stem and up the bowl and the third running along the bottom of the stem and up the front (i.e. the side away from the smoker) of the bowl. The decoration has been applied with a flat implement pressed on to the pipe surface. There is also an incision across the junction of the stem and bowl.

This pipe is mentioned here partly to note yet another area of the New World where these pipes occur - perhaps in this case with ultimate African origins - but mainly to observe that disappointingly this bowl bears no close resemblance to the Pamplin "Hayiti" bowl-form (see p. 205 and n.32) though some historical association between Haiti and the Pamplin products - export models particularly favoured there, perhaps - may yet be discovered (see now I. Walker 1975b).

CHAPTER 4

PIPEMAKING IN VARIOUS CENTRES

SECTION I:
INTRODUCTION

It can be seen from 1: V and VI that the spread of home-grown tobacco and the start of the Virginia industry appear to have happened simultaneously in the 1610s, and it seems reasonable to suggest that it was really from this time that smoking in England became a widespread habit. The rapid spread of the home-grown product and the phenomenal boom in the export of tobacco from Virginia clearly suggests this, the more so when one considers that prior to this only Spanish grown tobacco was available and not until 1604 was that obtainable legally. It seems likely that smokers at first fell into two classes - sailors who were able to obtain tobacco more easily than most, and people of fashion and social position in the capital and the university towns who could afford to buy tobacco. Typologically at least, the earliest pipes known in England are one found at Cambridge and two from London (Oswald 1959c: 201-11, 204 fig 3(14)-(17); 1960a: 42).

The monopoly given in 1613 to London to import tobacco was, like many other monopolies given to London companies during the earlier half of the C17, restrictive to Bristol's growth despite the widespread illegal trade which continued (Latimer 1900: passim), and it is fair to assume that the repealing of this monopoly in 1637 gave Bristol and the other ports a major boost. In the first half of the C17 London has vastly more pipemakers than all the other major future centres of production combined and it seems likely that London's advantage in the tobacco trade at least assisted in this. From the second half of the C17, however, Bristol pipemaking undergoes a very rapid expansion, which while only producing just over half the number of London makers known for the same period, gives a much higher proportion of pipemakers to the population of the city than does London. The second half of the century also sees appreciable numbers of pipemakers appearing in Broseley, Kingston upon Hull, and NE England. In the first half of the C18 the number of Bristol pipemakers continues to increase and indeed approaches the number known in London while Liverpool, Chester, and York show major increases in the number of known pipemakers. Thus while London was always numerically pre-eminent as a pipemaking centre, other centres became proportionately speaking more truly centres specializing in pipemaking. This broadening of the industry is probably associated initially with the widening availability of tobacco by the second half of the C17 following the withdrawal of the London tobacco monopoly - there is a noticeable concentration (Oswald 1960a: 43-4, figs 16 and 17) in this period of makers in Wiltshire, Somerset, and south Gloucestershire, the area of most intense home-growing of tobacco, as noted above. (The latest figures for pipemakers in various centres appear in Oswald 1970b: 227-8 - these supersede, and in some cases modify, conclusions in Oswald 1960a: 42-4, figs 15-17).

Before studying the Bristol industry in detail, however, the industries in other centres - chiefly Liverpool, Chester, Glasgow, Montreal and East London - all differing widely in time and background, are examined to see what, if any, common threads lie in the history of pipemaking areas.

SECTION II:
LIVERPOOL

Taking Oswald's list of English pipemakers (1960a: 55-102)[1] and noting the date Liverpool makers are first mentioned, we find one prior to 1700, between three and nine for each decade between 1701 and 1760, and then a dramatic increase for the period 1761-90. There is a fall during the period 1791-1810, then an increase between 1811 and 1830, after which the number of new names virtually ceases, though there is a slight revival in the 1850s. The detailed figures are as follows:

1701-10	6	1791-1800	7
1711-20	3	1801-10	9
1721-30	6	1811-20	13
1731-40	9	1821-30	11
1741-50	4	1831-40	2
1751-60	8	1841-50	0
1761-70	25	1851-60	4
1771-80	12	1861-70	2
1781-90	18	1871-80	2

These numbers are based on a single date: obviously many makers worked over a number of decades - for example, Oswald lists Thomas Birchall as working from 1817 to 1845 and Humphrey Lyon jr from 1761 to 1790; and James Atherton, noted by Oswald as dying in 1708, was working by 1678 (Chandler 1957: 333). The figures rely heavily on the accuracy of trade directories and other sources, and on the amount of research actually done; they often do not take into account whether the date given is that when a maker commenced work, or when he died, or any time in between, and they generally do not indicate how long a business survived. Further, they are biased by the arbitrary nature of the decades used in the preceeding table: for example, if each decade started only one year earlier (i.e. 1700-09 instead of 1701-10) the figures for the period 1770-99, while totalling the same as those for the period 1771-1800, would break down as follows:

1760-69	18	(1761-70	25)
1770-79	19	(1771-80	12)
1780-89	10	(1781-90	18)
1790-99	15	(1791-1800	7)

Similarly, while only two makers are first recorded in the decade 1831-40, seven are recorded for the decade 1830-39. As no new names are recorded during the 11 years 1840-50 it follows that five were first recorded in 1830. To anticipate a point made when discussing the Bristol burgess rolls (see 6: IV) it is likely that this reflects the drive made to find as many eligible voters as possible - in this case freemen - before the election year. Certainly in Bristol, once the guilds lost their control many craftsmen practiced their trades without taking their freedom, and often took their freedom only before an election and when forced or persuaded to. Alternatively, the source used - presumably a trade directory - may have been changed or brought up to date that year: a difference of five may seem rather large, but this writer found that with the change from the Glasgow Directory to the Glasgow Post Office Directory in 1828 the number of pipemakers rose from an average of two or three to a steady five and six; while three directories for Bristol in 1853 (two published by the same company) listed 17, 21, and 27 pipemakers there (Scammell and Co's Bristol General Directory..., Matthew's, and Scammell and Co's Gloucester, Bristol and South Wales Directory... respectively). A source of ca.1800 (quoted in Oswald 1970b: 228 n.6) said there were seven pipemakers in Liverpool at that time, a figure which at first sounds rather low, though as the source continues that they employed among them ca.120 men and women the seven "pipemakers" were clearly reasonably large firms.

However, it is clear from the jump in makers recorded from the 1760s onwards that Liverpool quite suddenly becomes an important centre for pipe manufacture during the second half of the C18. This is the more remarkable when one notes that throughout the C18 smoking declined, being replaced by snuff, a feature confirmed by a general decline in the number of pipe manufacturers known in England overall during the second half of the C18 (e.g. Oswald 1960a: 45, fig 18; 1970b: 227).

It is possible that, during this period of prosperity in marked contrast to the rest of England, mould-imparted names of makers and their place of work was introduced on stems by Liverpool makers, though conceivably it could also have come from Chester (Section III below). This feature (already noted in 1: II(g)) first becomes common shortly before 1800, but the earliest makers so far known to have used this idea are James Eaton of Liverpool F 1757 (assuming he is the James Eton noted in Oswald 1960a: 69) at least one of whose pipes occurs in a ca.1758-68 context at Louisbourg, Nova Scotia (Lindsay in litt. 8 November 1972 and in conversation) and William Morgan sr also of Liverpool working by 1767 one of whose pipes was found at Williamsburg, Virginia, in a sealed context of ca.1760-80 overlaid by material datable to the last quarter of the C18 (A. Noël Hume in litt. 11 August 1964). (Other James Eaton pipes have been found at Placentia, Newfoundland (Grange 1971: 532-3, 1963 fig 100d); elsewhere at Louisbourg (Hanson and Shott 1968: 39, 127 fig 32,F); and from Fort Beauséjour, New Brunswick (MacLean 1971: 39, 80 fig 30a).

Liverpool does not begin to expand as a port until the C17 - in 1634 when the ship-money tax was assessed Bristol was rated at £2,166 13s 4d while Liverpool was rated at only £15. Liverpool Puritans had to sail from Bristol to the New World in the early C17. Her growth was checked by the Civil Wars, 1642-48, but revived strongly in the second half of the century (except where otherwise noted, this section is based on VCH Lancs. IV: 16-37 - a convenient source but not accurate at all points - and Chandler 1957). The prime cause was trade in sugar, tobacco, and cotton with the West Indies and - illegally - Spanish America. There appears to have been relatively little trade with the American colonies until the C18 (cf I. Noël Hume 1963: 283, 284-5); Berry (1963: 5) notes that Liverpool trader Nicholas Blundell records in his diary supplying cargoes during the first quarter of the C18 for his brother who came across from Virginia two or three times a year.

Berry also notes (loc. cit.) that as early as 1674 the port records indicate pipes being exported through Liverpool, 1d being charged on every crate of pipes which was shipped to elsewhere in the country and 2d per crate for pipes going "into Forreigne Parts". In 1688 eight "creates" of pipes were shipped to Whitehaven from Liverpool (Weatherill and Edwards 1972: 166), and Willan (1938: 186, 1967 ed) notes pipes being shipped from Liverpool to Lancaster in 1690. These pipes need not, however, have been Liverpool-made, but could have come from centres of the industry such as Chester (discussed below), or Rainford where pipes were being made from about the middle of the C17, the earliest record of pipemaking there being of a maker who died in 1674 (Berry 1963: 1).

Subsidiary reasons for the rise of the port was the rapid development of Manchester industries; the relative safety of the port during the wars of the second half of the C17 (shipping coming by the north of Ireland and down the Irish Channel avoided most of the hostile fleets to the south) so that it paid, despite the costs involved (cf 5: I), to land goods at Liverpool and then use the extremely inefficient roads to the south; and the settlement of several London traders in Liverpool after the Great Fire of 1666 (Reddaway 1940: 245, 1951 ed; Mitchell and Leys 1958: 178, 1963 ed), though it was not until almost 100 years later - 1760 - that London-Liverpool stage-coaches were introduced (Latimer 1893: 309). In 1677 the Michaelmas customs returns listed only £3,500 for Liverpool compared to £51,000 for Bristol (Latimer 1900: 383). By 1701, however, it was being asserted that a proposed interference with the tobacco trade would "destroy half the shipping in Liverpool" and some satirical verse about the arrival of Customs officers to investigate duty evasion on tobacco, for which Liverpool was notorious in the early C18, claims Liverpool had eclipsed Bristol. This latter is an exaggeration, for in 1701 the number of vessels in the port was noted as 102, and this was still less than Bristol's total of 165, though 30 or 40 ships more than the number recorded for Liverpool only 12 years previously. By 1701 Liverpool was already importing cotton (Moffit 1925: 134).

In 1698 the monopoly on slaves held by the Royal Africa Company of London was ended (Lipson 1931: 357, 1956 ed), and both Bristol and Liverpool entered this trade, the latter in 1702 (Moffit 1925: 134). In 1730, 15 vessels were involved. In 1750, an Act of Parliament established an open company for African trade to which anyone could join on payment of 40s (Lipson 1931: 359-60, 1956 ed). Lists of members of the African Company for 1753 and 1755, though the figures differ considerably, show Bristol had appreciably more members than either London, which came next, or Liverpool, which followed (Latimer 1893: 271), though neither Bristol nor London appear to have been as vigorous in prosecuting their business as was Liverpool. As late as 1764 Bristol's customs receipts were over two and a half times those of Liverpool, being £195,000 as against £70,000 (Latimer 1893: 362); but in 1795, when an assessment of men to be found by ports for outfitting naval ships was instituted based on the number of vessels clearing port outwards, Bristol was only seventh with 666 vessels, London being first with 5,704 and Liverpool second with 1,711 (Latimer 1893: 514). The immense profit of the slave trade lay in the triangular trade, whereby cheap goods were shipped to Africa for slaves; the slaves taken to the New World, principally to Kingston, Jamaica; and sugar and tobacco brought back.

The C18 also saw a flourishing trade develop exporting Staffordshire slip-decorated wares and Buckley coarse earthenwares. The former are noticeably absent from Virginia in the C17, Bristol and North Devon pottery predominating, but it appears in the C18 (though the situation is complicated by the discovery (K.J. Barton 1962: 164-8) that Bristol was making very similar slip-decorated ware and that both centres were certainly exporting to North America). The distinctive coarse earthenware from Buckley in Flintshire, North Wales, was being exported in vast quantities from the early C18 until the Revolution (I. Noël Hume 1963: 283-5; 1970: 132-6; cf C.M. Watkins 1968: 126 and 128, 130 fig 65, 139 illus. 18 and 19). Other suggested reasons in favour of Liverpool's expansion was that it was a Whig town and from 1714 to 1762 there was a continuous Whig administration of the country, that sailors were paid little if any salary - this seems untrue (MacInnes 1963: 7) - and that woollen goods for export were cheaper here than elsewhere. Again, as in the second half of the C17, the relatively safe northern route to the port enabled it to thrive during the Wars of Spanish and Austrian Successions, 1702-13 and 1740-48, and the Seven Years' War, 1756-63.

The American Revolution, 1775-83, was disastrous to Liverpool's trade for a short time - in 1775 there was a week-long riot and during this time the population is said to have actually diminished. A quarter of the town's population of 60,000 was said to be living on charity (quoted in Latimer 1893: 415). However, 1778-82 saw Liverpool privateering rise as the French and Dutch entered the war; this ceased only because there were no more ships to capture, but by this time the destruction of the French merchant navy enabled Liverpool to capture their trade during the decade 1783-93. The Continental System and the War of 1812 with the United States and American privateers affected Liverpool adversely; but because all other shipping had been driven off the seas, by 1815 Liverpool had practically absolute control of the Atlantic trade. Concurrently with this, the Spanish American colonies were becoming independent, adding to the markets. In 1813 the monopoly of the East India Company was broken; the next year Liverpool ships were round the Cape. With the Lancashire industry in the immediate hinterland and canal transport available Liverpool at the beginning of the C19 had an almost unrivalled position.

The mushrooming of the port can be seen in both its population and its shipping figures. Gross tonnage of shipping went up from 19,175 tons in 1751 to 72,730 tons in 1787 to 129,470 in 1801; and the dock area doubled between 1756 and 1815 and again (Clapham 1926: 5) between 1825 and 1846. Population rose rapidly throughout the entire C18: from a figure of just under 6,000 in 1700 it had trebled by 1740, and more than trebled again by 1791 to a figure of 60,000. By 1827 this figure, even excluding the suburbs now springing up, had almost doubled to 118,000. The population figures are as follows:

*1700	6,000	*1770	34,000
*1720	8,000	*1791	60,000
*1730	12,000	1801	77,000
*1740	18,000	1811	94,000
*1750	22,000	1821	118,000
*1760	26,000	(* estimate)	

These figures indicate that from ca.1770 onwards there was a tremendous expansion in population; many of the immigrants were Irish and Welsh and the result of this dramatic rise was the widespread slums of the city (figures from Moffitt 1925: 140 and *VCH Lancs* IV, 33; cf Treble 1971: 167).

From this it can be seen that, as Oswald has suggesed (1960a: 45), the rise of the Liverpool pipe industry can be paralleled to some degree with the increase in the slave trade and in privateering, though the port had been expanding for a century before the pipe industry had its sudden expansion. Certainly by ca.1800 Liverpool pipes were being exported widely and especially to Africa (Chandler 1957: 340 and 345). The use of pipes in the Africa trade is known from other evidence - as late as ca.1780 special pipes known as hog pipes were being made in Chester for this trade (G.C. Spence 1942: 48-9) at a time when the importance of that city as an oversea port must have been negligible and the pipes must in fact have been shipped through Liverpool. Indeed, Liverpool makers may well have taken over this trade, contributing to the rise of their industry at this time: certainly in 1770 exports from Liverpool to Africa included 1,791 gross pipes (Donnan (ed) 1931: 596) - over 250,000 - indicating a major trade, and in 1767 eight barrels of pipes were included as part of the price of five slaves by a Liverpool ship (*op. cit.* 529)[2] The French also sent very large numbers of certain types of pipes to the Guinea coast with their slave trade (Duhamel du Monceau 1771: 4). Dutch pipes especially, and some English, ranging in date from the C17 to C19, have been found on a site in Ghana (Nunoo 1957: 16-17, pl III btm, additional photographs from author 23 May 1969, additional identifications Oswald *in litt.* 1 January 1969).

The earliest definitely-dated Liverpool pipes found in North America known to this writer occurred, as noted above, in a 1758-68 context at Louisbourg, Nova Scotia (Lindsay *in litt.* 8 November and 6 December 1972) and from a 1760-80 context at Williamsburg, Virginia (A. Noël Hume *in litt.* 11 August 1964), though other examples from Newfoundland (Grange 1971: 532-3, 1963 fig 100d), Nova Scotia (Hanson and Shott 1968: 39, 127 fig 32F), and New Brunswick (MacLean 1971: 39, 127 fig 30a) could all date as early as 1757. Other Liverpool-made pipes have been found in pre- or ca.1800 contexts in Canada - Nova Scotia (Omwake 1965b: 34-5), New Brunswick (I. Walker 1971d: 22-3; MacLean 1971: 39 and fig 30b), and British Columbia (*ex info.* R. Ingles, National Museum of Man, Ottawa) - and in the United States in Massachusetts (Hagerty *in litt.* 5 March 1969), Connecticut (Poirier 1974: 12), Virginia (Pawson 1969: 125), and North Carolina (Israel *in litt.* 5 August 1971). A Liverpool pipe is also noted at Port Royal, Jamaica, though in an unknown context (Oswald 1969: 69 no 18). These finds confirm Chandler's remarks that Liverpool pipes were exported widely at that time, and agree with the evidence noted above for the Liverpool industry's expansion from the 1760s onwards. Liverpool pipes of the first half of the C19 have been found in Newfoundland (Jelks 1973: 75), Ontario (*ex info.* Miss E.A. Wylie), and Quebec (material in National Historic Sites Service collections, Ottawa), and ones dating to the middle of the century have been found as far apart as Prince Edward Island, Canada (Davoud, now MacLean, 1969a: 11, fig 18) and California (Humphrey 1969: 17, 16 fig 8).

Liverpool pipes were also reaching West Africa as late as the end of last century or the earlier decades of the C20, for stems marked

H.B.W. Russell of Liverpool, who oddly enough is recorded in Liverpool trade directories not as a pipemaker but as an African merchant, have occurred on two sites in Ghana (Calvocoressi MS). (For a discussion of this marking of pipes with the supplier's name and not that of the maker, see p.160 above.)

However, it is difficult to believe the dramatic rise of the Liverpool pipe industry was occasioned solely by a sudden shift to Liverpool-made pipes in the city's export trade: it seems likely the nearly fourfold increase in population between 1770 and 1821 made an important contribution. Further, these people apparently wanted to smoke, and if this sounds self-evident it must be remembered that Liverpool seems to have been alone in this boom in the pipemaking industry, for as noted earlier the second half of the C18 saw the English pipe industry in general in a marked decline.

The basic reasons for the rise of the Liverpool pipe industry therefore seem to be a taking over by Liverpool makers of an export market previously largely held by Chester pipemakers, and a rapid rise in population which unlike in the rest of England included a large number of people who favoured smoking. Because of the imprecise method used to estimate the number of pipemakers in business each decade it is difficult to say whether the temporary lessening in new pipemakers noted in the decades 1771-80 and 1791-1810 (only a relative lowering of the numbers in any case) can be equated with economic events - the disruption of the New World trade by the American Revolution and the war with France could fit the former and the Napoleonic Wars and the abolition of the slave trade in 1807 the latter - although the number recorded for the decade 1811-1820 is still higher than that recorded for the decade 1751-60. The prosperity of the port does not decline - in fact the trade figures show a slow but steady increase into the 1850s and it is not until the 1880s that they begin to decline - nor does the population lessen: including now the suburbs which subsequently become part of the city, the population of Liverpool nearly doubled between 1841 and 1861, and 1840s seeing colossal numbers of Irish arriving either as permanent settlers or en route to North America (cf Lawton 1970: 404-5, 397 fig 9b, 398, 399 fig 10). The population figures are as follows:

1831	189,000	1871	493,000
1841	286,000	1881	611,000
1851	376,000	1891	617,000
1861	463,000	1901	685,000

The relative lack of pipemakers during the earlier half of the C18 may seem strange when the population increase during this period, albeit much less than that in the next half, is considered. However, as will be noted later, it was this time which saw Chester's major period of manufacture and it is likely that initially Chester was an adequate and convenient enough source for Liverpool.

Oswald, noting the numbers of pipemakers by half-centuries at Bristol, Chester, Kingston upon Hull, and London from sources available in 1959 showed (1959c: 202) that after rising throughout the period 1600-1750 the numbers declined in all four centres during the period 1750-1800 but that by 1800 the number in London had risen appreciably while in the other centres the decline was maintained to a greater or lesser degree. This, Oswald suggested, was a result of the industrial revolution affecting the population of London, and he also noted that at other industrial centres such as Birmingham the same increase is noted. Unfortunately, more up-to-date figures for these four centres (Oswald 1970b: 227) gives a less simple picture. The second half of the C18 does see a general drop in the number of clay pipe manufacturers, though possibly less severe than thought earlier (cf Oswald 1970b: 228), for Chester and Hull figures remain steady and the spectacular London drop - from 228 in 1700-50 to 60 in 1750-1800 - is partly accounted for by apprentice and freedom lists for the latter period being lost and the rarity of trade directories before 1800. Figures by half-centuries are tricky to use however, and may obscure declines which took place after, say, 1770 rather than after 1750. There is ample evidence, as noted above (Chapters 1 and 3), that smoking declined in its social acceptability in the face of snuff as the C18 progressed, and Oswald's figures for other centres (1970b: 277) as well as this writer's Bristol work indicate a widespread contraction of the pipemaking industry. Despite an undoubted increase in the number of pipemakers recorded in the first half of the C19 due to the advent of trade directories and other records, it still seems fair to say that the industrial revolution and the big industrial cities added to the revival of pipe-smoking.

This might seem to agree with the Liverpool evidence, inasmuch as demand in the form of a large population re-stimulates the industry. Bristol, Chester, and Kingston upon Hull, by contrast, are less affected by the industrial revolution than London and centres in the Midlands and northern England - none of them belongs to an area of heavy industrialization. (However, as will be shown, Bristol did have a resurgence of clay pipemaking during the period 1810-60.) Further evidence of this suggestion comes from Leicester (Daniell 1965: 59-60). Here, from a single pipemaker recorded at the beginning of the C19, the number steadily increases until in 1846 there are seven. By 1863, there are six, and by 1884 the number is down to three. The industrialization of Leicester, and an attendant rapid growth in population, occurs in the 1840s.

However, this might also seem to contradict the evidence from Liverpool, where clay pipemaking was declining after the 1820s and 1830s - appreciably earlier than in other industrial centres - but in fact this is more likely explicable as an example of different places being affected differently by local customs and habits. In other words, suggestions that the decline in clay pipe smoking was caused by the introduction of other forms of smoking, are true only in a general sense and in fact different centres were affected by different innovations in smoking, and indeed other factors, at different times.

An excellent example of this comes when comparing Liverpool's pipe industry with that of Rainford, only ca.12 miles away. At Rainford the peak of prosperity was during the first four decades of the C19, the very time that the Liverpool industry appears to have been contracting. At one time in this period there were over 30 shops and factories, with 20 families in business, in a village of 1,500 people. Some businesses employed over 50 people; others may have been extremely small enterprises, but even as late as the beginning of this century, when the Rainford industry was a shadow of its earlier self, one firm employed 50 men and turned out over 15,000 pipes a day (Berry 1963: 6, 8). Such prosperity indicates not only that clay pipe smoking continued to be popular, but that there was still a widespread trade in these pipes, no doubt to the rapidly-expanding industrial areas of Lancashire and west Yorkshire.

One stem-fragment marked RAINFORD has been found in Massachusetts, associated with material probably datable to the last decades of the C18 and the first of the C19 (Hagerty in litt. 4 February and 5 March 1969); and one marked H. RAINFORD was found in New Brunswick, Canada, in a context probably not earlier than the early 1860s (ex info. Miss E.A. Wylie and Miss D.L. Herst). Unfortunately, in both cases the preceding part of the stem had been broken off so that it was impossible to say what preceded "Rainford". No pipemaker of this name is recorded by Oswald, and the H. might be the end of a maker's name rather than his initial. Unfortunately, Berry does not publish any lists of Rainford makers; he does, however, note that the export trade was always an important aspect of the Rainford pipe industry and that the biggest markets were in America and among the Boer farmers in South Africa (Berry 1963: 4).

As early as the end of the C17 there were complaints in Liverpool that pipemakers outside the town were taking advantage of the cheapness of their products (relative to Liverpool-made pipes) to undercut Liverpool makers (Berry 1963: 7), and it may well be that in the early C19 Liverpool makers became progressively less able to produce pipes at a price comparable to those made by no doubt less well-paid workers at Rainford and thus their industry began to contract.

As already noted, cigar-smoking was introduced into Britain in the 1810s. In the 1820s and 1830s it seems to have rapidly increased, as to some extent did the general consumption of tobacco, so that by ca.1860 it was stated that more than half the tobacco smoked in the major centres in this country was in the form of cigars (see 1: VII(e)). It is therefore fair to assume that it was cigar-smoking rather than the meerschaum pipes Oswald (1960a: 46) suggests, which caused the decline of the clay pipe. Certainly cigarettes and the brier pipe did not play any part in the decline of the Liverpool industry, for neither was introducted until the second half of the C19. Snuff was going out in the earlier or middle C19, and the meerschaum pipe and similar cheroot- and cigar-holders (e.g. Oswald 1959c: pls 129a, 129b and 130a) were aristocratic items which cannot have been used by the masses (plain pipeclay holders, however, are known - Southorn's made them, for example). Oswald's suggestion that cheroot-holders, along with meerschaum pipes, took over from clay pipes cannot be true, but the introduction of the cigar may well have been a major factor in the decline of the Liverpool clay pipe industry.

It is possible that the popularization of cigars actually took place initially in Liverpool rather than by way of army officers returning from the Penninsular Wars, for a writer in 1829 said that 25 years previously cigars had been little-known and could be obtained only from West Indian captains of Liverpool and Bristol ships (Penn 1901: 88). This suggests the introduction of the cigar may have been partly from direct New World influences, and Liverpool being so much more a flourishing port at this time than was Bristol it may be that Liverpool played a part in the initial spread of cigars. This might be a more convincing explanation for their apparent use regardless of class, for the new habit brought back by army officers would have been imitated more by socially-conscious classes (cf Penn 1901: 181).

It is dangerous, bearing in mind that figures derived from Oswald's 1960 lists cannot give an accurate picture, to push interpretations of these figures too far, but one hint that they may reflect trends reasonably accurately is the temporary dip in the number of new pipemakers recorded for the period 1791-1810, for this was the time of Britain's wars with France and a time of soaring costs and lowered wage-values (see 5: II), all of which would have tended to depress the industry (it was also a time when tobacco-consumption was at a somewhat depressed level, but this phenomenon covered a much longer period, starting in the 1790s and not beginning to recover until the 1830s (1: VIII)). Certainly, the evidence of the rapid decline in the number of first mentions of pipemakers in the 1830s, unless it is a total distortion must indicate a break in the prosperity of the industry. Indeed, no new names are recorded during the 1840s.

The 1850s, however, see what seems to be a minor revival, and this is particularly interesting when related to events in the Glasgow and Montreal pipe business at the same time. As already mentioned, Irish arrived in Liverpool in vast numbers in the 1840s - 300,000 in 1847 alone - and a similar phenomenon is observable in Glasgow and Montreal. There too, there is a rapid increase in the number of pipemakers in business in the 1850s. The connection between the Irish and clay pipes has become traditional (e.g. Fleming 1923: 237-8; Rynne 1967: 34 and refs - in Ottawa, clay pipes, bedecked in green ribbon, appear in tobacconists' windows at the approach of each St Patrick's Day) and a list of Scottish, and particularly Glasgow, pipe-types in production in 1900 (Anonymous 1900) gives a large number with Irish names - famous ones including terms such as Dublin, Cork, and Limerick, others such as Derry, Belfast, Waterford, Tralee, Mayo, Ulster, and Connaught - and though this is a tradition that can go back no farther than the beginning of the C19, snuff (see 1: VII(b)) being the C17 and C18 Irish tobacco-taking tradition, it seems very likely that the arrival of large numbers of Irish in the 1840s stimulated the clay pipe industry in the centres where these immigrants settled. This Irish predilection for pipe-smoking continued at least into the 1920s, at which time 60% of tobacco consumed in Ireland was pipe-tobacco, compared to a figure of ca.40% for the United Kingdom (Alford 1973: 385). Unfortunately, none of the new pipemakers recorded in Liverpool during the second half of the C19 has Irish-looking names, so we are denied this piece of corroborative evidence.

While the Irish settlement in Liverpool, Glasgow and Montreal (and East London through the effect of this on the East London pipe industry has yet to be examined) following the Great Famine was colossal, large-scale Irish emigration to these and other places dated to well before the later 1840s (George 1925: chapt 3, esp. pp120-31, 1966 ed; Freeman 1957: 37-49; E.P. Thompson 1963: 669-85, 1968 ed). Unfortunately it is not possible to say whether this had any effect on the pipemaking industries in the earlier C19. Because the Glasgow and Edinburgh industries appear to be virtually non-existent until the early C19 it might be that Irish immigrants had some effect on them, but this pre-supposes that the Irish were commonly smoking pipes by 1800, and in fact what evidence there is at present available suggests the popularity of clay pipe smoking in Ireland parallels rather than precedes its popularity in Scotland.

Dublin trade directories do not have classified trades lists before 1835, but in that year only six makers appear, a figure which has not changed 10 years later; and spot checks on figures in succeeding decades - five in 1845, nine in 1862 and again in 1876 and 1885, four in 1895, and two in 1901 (Dublin Public Libraries in litt. 19 February 1968) - indicate the Dublin industry reached its peak in the later C19, the same time as did the Glasgow and Edinburgh industries (see Section IV below). By this time the English industry was well into its final decline, so it would appear the Irish and Scottish industries were paralleling each other, at least for most of the C19. By 1832 pipes were being made in Co. Roscommon and being used especially at wakes (Weld 1932: 511-2), and they had been made for some time at Knockcroghery, the village involved, for some time, the industry apparently having been started by a settler who was a pipemaker. If pipes were being made in this country part of Ireland for some time prior to 1832 it seems likely they were being made in centres of population by ca.1800; however, Wesley's comments on the prevalance of snuff in Ireland in his time suggest smoking cannot have been very common before 1800. One piece of evidence reinforcing the impression that the Irish started pipe-manufacturing to any extent only in the early C19 comes from the Bristol port-books, where work by Jackson and Price (R. Price in litt. 18 January 1974) shows that after fairly steady exports of pipes from Bristol to Ireland during the last quarter of the C18 the quantity begins to decline from the beginning of the C19 and this decline coincides with the rise of pipeclay exports to Ireland, clearly suggesting the beginning of an Irish pipemaking industry which must certainly have increased the use of pipes in Ireland not only by making them more readily available but simply by producing more cheaply than the cost of imported pipes. Earlier Irish immigration to Liverpool certainly does not appear to have checked the seeming slump in numbers of pipemakers there in the last decade of the C18 and first decade of the C19 (see above). There is not a clear enough dip in the number of Dublin makers recorded in the 1840s and 1850s to suggest the Famine of 1846-47 caused much of a contraction in the industry, but it is clear pipe-smoking was reaching a height of popularity in the decades following 1850 and one could expect this to be reflected in any place where large numbers of Irish settled.

Thus to sum up the findings on the Liverpool pipemaking industry, it grew up not so much with the general growth of the port or of its trade, both of which were expanding by the beginning of the C18, but with the slave trade which used pipes to trade with West Africa and had hitherto used Chester-made pipes and an extremely rapid rise in a population which demanded pipes. However, during the second quarter of the C19 the industry declined, because of a complex mixture of reasons - perhaps most likely because when smoking increased following the Napoleonic Wars there was a widespread change by people of all social classes to cigar smoking, but with pipes made outside the city undercutting the city makers and the abolition of the slave trade as probable other factors. In the 1850s there appears to have been a revival of the pipe industry associated with the influx of Irish in the late 1840s and following years.

SECTION III: CHESTER

When the same initial approach is used to examine the Chester pipemaking industry, different problems arise. Oswald's 1960 lists suggest a rapid increase in the decades between 1711 and 1740, the decade 1731-40 being the most prolific of all. The next two decades saw something of a decline, but the period 1761-70 saw a marked increase. The decades 1781-80 and 1811-20 and to a lesser extent 1841-50 saw marked but apparently isolated increases. The full list of figures is as follows:

1641-50	2	1751-60	6
1651-60	2	1761-70	13
1661-70	1	1771-80	3
1671-80	3	1781-90	11
1681-90	4	1791-1800	3
1691-1700	5	1801-10	1
1701-10	3	1811-20	12
1711-20	12	1821-30	3
1721-30	11	1831-40	5
1731-40	20	1841-50	6
1741-50	8	1851-60	1

In this case the alteration of the decades by one year, referred to when considering the Liverpool evidence, makes no significant differences except at the very end where the 1841-50 peak becomes an 1850-59 peak.

A more detailed examination of Oswald's figures for the decades 1731-40 and 1861-70 reveals that of the 20 pipemakers first recorded in the former decade 16 had gained their freedom in 1732, while of the 13 first mentioned in the latter decade 10 became free in 1767. In discussing the Liverpool figures the Bristol practice of large numbers of craftsmen taking their freedom immediately before an election was noted: the Chester figures for 1732 may represent the same occurrence, for there was a by-election there last year, but the significance of the 1767 figure is unknown, for there was neither general nor by-election that year - possibly there was an attempt by the city council to enforce the almost-dead legislation allowing only freemen to ply a trade within the city. (Information on Chester by-election from Chester City Archives; on general elections from Interim Report...House of Commons Personnel and Politics 1264-1832, 1932).

It must be admitted that the Chester statistics do not arrange themselves so conveniently as do those of Liverpool; and it is difficult to decide whether later, isolated, increases in first mentions are anything more than a consequence of the imprecise method and incomplete sources used. For example, Oswald's recent figures (1970b: 227) of 61 makers in the period 1700-50 and another 61 for the period 1750-1800 suggest a different picture to that of 11 years previously (1959c: 202) when the figures were 60 and 36 respectively (the figures as worked out from Oswald 1960a - above - are in fact 54 and 36 respectively). However, it is possible that Oswald's 1970 figure for the period 1750-1800 conceals a larger number towards 1750 and a drop towards 1800, and that the first half of the C18 saw the peak of Chester's pipemaking industry. Thus Oswald's earlier suggestion (1960a: 45) that Liverpool's increase in pipemaking was at the expense of Chester, and was connected with the latter's rise as a port and the former's decline might still be true.

There are undoubtedly grounds for this assertion, and not only in the way the figures may relate to each other. In the C18 there is a famous Chester family of pipemakers, the Meakins (Oswald 1960a: 42-4; cf G.C. Spence 1942: pl VII), the first of whom obtained his freedom in 1721. The relationships of the various Meakins has never been ascertained, but sons of the first Meakin, Randle, can be fairly certainly identified by their apprenticeships and also their dates of freedom. In 1766 a Luke Meakin is noted in Liverpool - just when the Liverpool pipemaking industry is expanding - and chronologically he could be one of the numerous sons of the first Chester Meakin. It is certainly extremely likely that he was of the same family. In 1755 a William Makin is recorded in Liverpool, and in view of the way in which family names frequently changed their spelling it is quite likely that Makin belonged to the Chester Meakin family. If so, he was most likely of the third generation. That the Meakin family continued in Chester, however, is indicated by one taking his freedom as a pipemaker in 1826 (G.C. Spence 1942: loc. cit.).

Similarly, another Chester pipemaking family was that of Powell (Oswald 1960a: 85-8; cf G.C. Spence 1942: loc. cit.). Again the relationships of the various Powells have not been studied, but the name occurs six times in Chester between 1710 and 1850 and at Buckley in North Wales 8 miles west of Chester into the C20 (G. Lewis 1970: 2nd page), and again a Powell is found working in Liverpool, in 1790. Three Chester pipemakers called Hall occur in the second half of the C18 and the first half of the C19, and two with that surname are noted in Liverpool in the second half of the C18 (Oswald 1960a: 73-8).

Similarly again, a Hayes family, a branch of which continued in the potting trade into this century, made pipes at Buckley from the second half of the C17 well into the C18 (Messham 1956: 33-4, G. Lewis 1970: 1st page; Cropper 1906; Anonymous 1965: 7): one Hayes, Thomas, became free in Chester in 1727 and several appear as pipemakers in Liverpool, mostly towards the end of the C18 - Samuel 1721, Jeremiah 1770, Able 1774, Edward 1791 (Oswald 1960a: 73-8), and Thomas a Liverpool pipemaker who died in 1800 and whose will was proved at Chester (editor's note in Cropper 1906: 44).

However, the idea that the decline of Chester as a port coincided with the rise of Liverpool, which is often stated (e.g. VCH Lancs. IV, 16-17; Moffit 1925: 135, 149; Steers 1946: 109, 1964 ed) and is implied in Oswald's remarks, is misleading. At the beginning of the C17 small boats were able to reach Chester, but larger ships had to lie six miles below the city. (The following remarks are based except where otherwise noted on Willan 1936b: passim, 1964 ed; 1937a; 1938: passim esp. 180-6, 1967 ed; Chandler 1957: passim). There appears to have been some improvement in navigation ca.1700 and in 1707 it was said that at spring tides vessels drawing nine ft could reach Chester, but it was not until 1737 that a new channel was cut to improve what through silting by tidal and wind action was in the earlier C17 called the worst river for navigation in the country.

Coastal trade appears to have increased during the C17 - tobacco pipes for Caernarvon and Beaumaris are noted - and in the middle of the C18 pipe-clay from Poole and (rather curiously - presumably a reshipment of clay originally from Poole or North Devon) Milford is recorded arriving. Pipeclay from Exeter - presumably also originally from Poole - and Bideford is also recorded (Craig 1962: 116, 128); according to Shaw (1829: 125, 1970 ed) North Devon clay was known in The Potteries as "Chester clay" because it was shipped through Chester. Following the improvements of 1737 there was a rapid growth in coastal trade in coal, firebricks, and earthenware. In the 1740s the rapidly-expanding earthenware trade in Buckley-made pottery was almost exclusively with Dublin, but in the 1750s this was becoming sporadic and was partly replaced by trading with Welsh ports (Messham 1956: 31). Between Christmas 1748 and Christmas 1749 a total of 118 cargoes are recorded being shipped coastwise from Chester, but relative to other ports such as Liverpool (which had been growing rapidly since the mid-C17) Chester's trade was obviously declining. Chester merchants certainly felt that Liverpool was taking away their trade, as is evidenced by their attempts to assert some authority over that port, which throughout the C17 was technically a member port of Chester, but clearly Chester would have been incapable of handling any great increase in shipping.

The distinctive coarse earthenware made in the Buckley district of Flintshire, North Wales, was exported to the American colonies in vast quantities from the early C18 to the Revolution, but though Buckley is only eight miles west of Chester the pottery shipped to North America went through Liverpool (I. Noël Hume 1963: 283; 1970: 132-3), and it seems likely that ocean shipping rarely used Chester or even the harbours farther down the Dee. Certainly the shipments noted above going through Chester in the mid-C18 were either along the north and west Welsh coasts or to no farther than Ireland; while shipments in the earlier C19, now from King's Ferry to Connah's Quay below Chester, still went no farther than north, west, and south Wales ports and Ireland (Messham 1956: 49-55). It therefore seems reasonable to suppose that the Chester clay pipes shipped overseas, for example the elaborately-decorated stem-fragments found at Louisbourg in Nova Scotia which are probably from Chester pipes (I. Walker 1971c: 70, 69 fig 11, cf 111 and 114-5, 108 fig 40 extreme left) and the "hog pipes" made for exporting to West Africa presumably as part of the slave trade (G.C. Spence 1942: 48-9; quoting a source of 1810), went through Liverpool. The same 1810 source states that ca.1780 Chester pipes were "esteemed the best in Europe" but that by 1810 "The home trade only remains and that in a diminished state".

At the 1818 general election 12 Chester pipemakers voted (G.C. Spence 1942: 65), a figure which might suggest there was still, or again, a sizable business in the city, but this depends very much on how many are factory-owners and how many ordinary artisans. As already noted in the preceding section, seven "pipemakers" were noted ca.1800 in Liverpool employing between them ca.120 men and women, and in Bristol as early as the 1760s John Frederick Bryant sr was employing up to ten journeypeople (Bryant 1787: viii), indicating the 12 Chester pipemakers if ordinary artisans could have worked for only one or two firms. The 1818 Chester poll-book lists street of residence for voters, and the pipemakers evidently tended to live in groups, for four are noted in Union St, one in Foregate St which lies parallel to it, and three in Love St, which runs between them. This tendency for pipemakers to concentrate in certain areas within a community is one which will recur repeatedly in this study, both in Britain and abroad (see following sections).

As Liverpool appears not to have manufactured many of its own pipes at first, Chester pipes no doubt found a ready home market there. As the rise of the Liverpool pipe industry resulted from the city's rapid increase of population, it is reasonable to suppose that this industry initially supplied local demand with cheap pipes. Thus the reference to superior Chester pipes as late as the 1780s is not improbable. It may be suggested however, that mass-production in Liverpool ultimately killed quality-production in Chester.

In fact, little detailed work has been done on the Chester industry, particularly in the identification and illustration of Chester-made material, for though Spence produced an invaluable list of pipemakers from various documentary sources - apprentice and burgess rolls, parish registries, poll-books - and does illustrate several marks, bowl forms and typological development are not illustratd and have never been examined; and little excavated material has been published. A mid-C17 Chester bowl illustrated by Oswald (1959c: fig 4(21)) shows Broseley-style attributes while C18 bowls illustrated by Webster and Barton (1957: 24 fig 1,a-c) indicate a variety, probably local, of Oswald's type 9 form was used by that time. Elaborately-decorated stems, apparently adopting as motifs inn-signs of various Chester hostelries, are noted by Webster and Barton (ibid. 19-21, fig 1,1-10; cf G.C. Spence 1942: pl IV; I. Walker 1971c: 70, 69 fig 11, 111 and 114-5, 108 fig 40 extreme left) and are distinctive of the Chester pipe-industry, decorated stems being rare otherwise in England (see 1: II(g) and refs).

One point worth noting as further suggesting close connections between the Chester and Liverpool pipe industries is the use by at least one Chester maker of the same style of mould-imparted stem-mark as that being used in Liverpool in the second half of the C18 - the maker's name and his place of work together on the same side of the stem. The Grosvenor Museum, Chester, has a pipe marked thus "Maires and Sons, Chester" (Grosvenor Museum in litt. 9 June 1972). The museum ascribes to it an C18 date; the firm is not noted by Oswald (1960a) but a John Mires or Myers F 1722 fl 1732 is recorded (Oswald 1960a: 82; G.C. Spence 1942: pl VI and p.64; cf possible pipe by this maker from Port Royal, Jamaica, Oswald 1968 81 no 194 with I/MIH/VRS in a Bristol-like cartouche on the rt side of a type 9 bowl) who could be an earlier member of the family). It would be interesting to know which pipemaking centre copied which with this form of stem-marking - as noted in 1: II(g) only Liverpool and Chester appear to have put name and place of work together, and Liverpool at least apparently abandoned it by the early C19 in favour of the standard form with place of work on the opposite side of the stem from the name. In view of the inventiveness of Chester makers with apparently mould-imparted stem decoration in the earlier C18 it seems possible they might also have hit on the idea in mid-century of mould-imparting their name and place of work on the stem.

Chester was situated in a predominantly agricultural area, and the industrial revolution came very late to the region, especially to the Wirral (excluding Merseyside which must be regarded as part of the Liverpool complex). One may guess that the opening of the Chester-Ellesmere Port branch of the Shrophsire Union Canal in 1798 and the Chester-Birkenhead railway in the 1830s stimulated the Chester area, but it is quite possible that by this time Liverpool had become such a manufacturing centre that it completely overshadowed Chester as a supplier. However, it should be noted that the Rainford industry could flourish while that in Liverpool declined, and it is tempting to suggest that the sudden first mention of no less than six pipemakers in the ten years 1841-50 - almost the last time any new pipemakers from Chester are recorded - is, like the increase for the 1851-60 period in Liverpool, caused by the Irish influx to the Liverpool area creating a temporary market which aroused Chester makers to start or restart businesses for a short time.

Thus it can be said that a closer study substantiates Oswald's suggestion that the Chester pipe industry declined in the C18 because of the rise of the Liverpool industry, although not because the latter replaced the former as a port during this period. The Chester industry appears to have died because its markets were lost and its quality-produced pipes were undercut by quantity-made pipes from Liverpool.

SECTION IV:
GLASGOW

A more detailed experiment may be made with the records of Glasgow pipemakers. Preliminary work by this writer, mainly on Glasgow trade directories, suggests that prior to the C19 there were very few pipemakers and that the number only slowly increased towards the middle of the century. For example, at the beginning of the C19 there is only one pipemaker, William White, whose firm closed in 1955 and who is said - by an unreliable source (Fleming 1923: 242-3) - to have been given in 1805 the pipemaking branch of the Corporation of Tobacco Spinners of Glasgow (the spinning of tobacco was the production of twist tobacco for pipe-smoking). Advertisements of White's appearing in 1877 and 1893 also give 1805 as the firm's foundation date; the trade directory for 1805 gives White as having a "rope-work", on Great Dovehill, but in 1806 gives him as having a "pipe-work" there. (Curiously, in 1828 the first issue of the Glasgow Post Office Directory, a superior directory to those appearing previously, also lists a ropeworks at White's address, though White himself does not appear; by this time White had moved across the Gallowgate to 15 Gibson St. These entries are probably misprints.) Eyre-Todd (1934: 271-2 citing the city records; this is presumably the source of the information quoted to Omwake in 1957a: 7) says that the Society of Tobacco Spinners successfully petitioned to be recognized as a "legal subsisting society" on 8 September 1779, and possibly at this time it changed its name to the Corporation of Tobacco Spinners.

As already noted, Glasgow's entry into the tobacco trade did not occur in earnest until after the Union in 1707 made direct trading between Scotland and English colonies legal, though tobacco was arriving steadily by the 1680s. Glasgow had several advantages, however. Its merchants were able to give better prices to Virginia planters (MacInnes 1926: 180-1), hitherto at the mercy of English traders. Other advantages compared to, say, Bristol were similar to those of Liverpool, Glasgow's arch-rival throughout the C18: the safety of the northern route from foreign navies in time of war and from privateers in time of peace; and suitable material for export - chiefly cloths not only from all over Scotland, but from NE England and the growing industries of Manchester, Sheffield, and Birmingham, which found Glasgow and Liverpool easier to trade with than the ports of the south. Further, Glasgow had agents in the tobacco colonies by the 1720s and also had agents in the staple warehouses in the main European re-export markets, both of which practices contributed to lower costs. Glasgow is also nearer Virginia than are the southern ports, and as a result each round voyage could be two to three weeks faster, with resultant advantages of savings in food and wages for the crew and the squeezing in of an extra voyage in the season - Defoe observed (noted in J.M. Price 1954: 305, 1967 ed) that a vessel could go from the Clyde to the Virginia coast in the time a London ship might be kept at Portsmouth by contrary winds in the Channel, and one set of figures (Stevenson 1973: 19-20) was 37 days from the Clyde to the Chesapeake compared to 51 from Bristol. There was also, as Price notes (1954: 303, 1967 ed), a general decline by the end of the 1740s of the small ports of SW England which had been involved earlier in the tobacco-trade - Padstow, Truro, Fowey, Looe, Plymouth, Dartmouth, Exeter, Lyme [Regis], Poole, etc, and even in the larger ports such as Barnstaple, Bideford, Falmouth, Penryn, and Weymouth - and a shift in the centre of gravity to more major ports in the North-West.

The biggest reason for the rise of Glasgow's tobacco trade, however, was that from ca.1740 its merchants had been winning contracts to supply the *Régie* of the *fermiers généraux*, which taking over the state monopoly from the *Compagnie des Indes* in 1730, held the monopoly to supply tobacco in France until 1791 (Herment 1952: 108-10, 1965 ed). It is from this time that the Glasgow tobacco trade rapidly expands. In the first half of the C18 Amsterdam was the major trading centre in Europe for tobacco, and as late as 1755 The Netherlands bought more tobacco than all other European nations together; but the vast French monopoly market suited the growing Glasgow trade with its large partnerships better than the open market policy of the Dutch where small and large merchants could compete on virtually equal terms on a hogshead by hogshead basis, a basis which increased the marketing costs and eliminated the savings the Glasgow merchants were hoping to achieve by bulk selling. Between 1757 and 1771 there was a dramatic change in the direction of the Glasgow re-export trade, France quite overshadowing The Netherlands (Stevenson 1973: cf 21 fig 1 and 22 fig 2). Other countries to which Glasgow re-exported tobacco were Ireland, Norway, Sweden, Germany, Poland, Portugal, Spain, Minorca (a British possession for much of the C18), and Italy.

The spectacular growth in the last part of the C17 and the earlier part of the C18 of Whitehaven on the Cumberland coast was similarly due in large measure to profits made in re-shipping tobacco. Whitehaven had a hinterland of little economic value, though it exported coal from the adjacent coalfields to Ireland, but it was more convenient for ships bringing tobacco destined for re-shipment to Ireland under the Navigation Laws to use Whitehaven than to continue on to Liverpool. By the 1720s, however, Glasgow's tobacco-trade with Ireland had expanded enough to affect that of Whitehaven, and from the early 1760s until the early 1780s Glasgow was Ireland's chief supplier, though Whitehaven's trade did not cease until the end of the 1770s. By this time (1779-80) Ireland was being allowed to trade directly once more, and began to import substantial amounts of tobacco from the former North American colonies (Andrews 1955: 108-9; L.M. Cullen 1968: 76, 90, 161, 48; Davies-Shiel 1969: 23).)

English merchants, including those of Bristol, did not surrender without a struggle, and in the 1720s there was a protracted attempt to claim that Glasgow merchants were guilty of fiscal irregularities. These claims were proved wrong, but the English merchants were able to exert enough influence to hamper Glasgow trade until the mid-1730s (e.g. Latimer 1893: 135 citing a letter from a Bristol merchant admitting the falsehood of the allegations; MacInnes 1926: 180-1; Flinn (ed) 1966: 122-3, quoting a source of 1733) - from 1,450,000 lb annually in the years following the Union the amount of tobacco imported by Glasgow had jumped to 2,500,000 lb by the mid-1710s to 6 million lb by 1722, but it was not until 1741 that the figure reached 8 million lb (J.M. Price 1954: 300, 1967 ed).

From 1741, however, the figures rose very rapidly as the following table shows, reaching a peak of 47,250,000 lb in 1771:

1743	10,000,000	1753	24,000,000
1745	13,000,000	1760	32,000,000
1752	21,000,000	1771	47,250,000

(figures from J.M. Price *loc. cit.*, exact 1771 figure - 47,268,873 lb - in Stevenson 1973: 20). In 1744 Glasgow accounted for 20% of all tobacco imported into Great Britain; in 1769 this share was 52%, the highest it reached. In 1751, when a tax was put on all tobacco lying in bond, Glasgow merchants had some 30 million lb weight. In 1755 manufactured re-exports brought in customs 30% higher than those of the entire tobacco import into Glasgow (Derry 1963: first pt, 146-7). Ashton (1955: 161, 1961 ed) gives an occasion when tobacco was rated on entry to this country at 19s a cwt and on re-export at 38s a cwt (it must be pointed out, however, that costs of collecting, transporting, warehousing, and selling to foreigners were not small, and that risks were high; Devine (1971: *passim*, esp. 291-4), though dealing primarily with Glasgow's West India Trade during the period of war with the American colonies, 1775-83, gives an idea of the sort of risks run by merchants at this time).

As indicated above, the Glasgow tobacco trade reached its zenith ca.1770, and during the glut years of the early 1770s the amount of tobacco imported through Glasgow both in absolute terms and as a percentage of tobacco imported into Britain as a whole declined somewhat, the former figure being down to 45 million lb by 1775 and the latter to ca.45 per cent. However, it was the American Revolution which ended the era of Glasgow's Tobacco Lords. Some of the merchants had seen the probable course of events and had pulled out in time; two, Speirs and Cunningham, contrived to make even larger fortunes for themselves by storing large amounts and selling this at inflated prices when the trade had been totally destroyed. How completely destroyed the trade was can be seen from the trade figures for the years 1775 to 1777. From 45,000,000 lb imported in 1775 the figure fell to 7,500,000 lb in 1776, and to 300,000 lbs in 1777. Many of the Tobacco Lords were ruined, for example the Buchanans (though a son of the last Buchanan Tobacco Lord went to Virginia and eventually made another fortune). The effect on Scottish trade as a whole was less severe only in degree - in 1778 Scotland's total trade was only 58% of the 1771 level (Mackie 1964: 292, 1969 ed), which gives some idea of the disproportionate importance of the tobacco trade and associated exports to the Scottish economy. In 1772 tobacco had amounted to 80% of all Scottish imports from North America and ten years earlier, in 1762, the figure had been as high as 85 per cent. Indeed, in 1762 tobacco had comprised 40% of *all* Scottish imports (excluding those from England) and 47% if Ireland were not included as overseas. In return, Virginia and Maryland received 83% of all Scottish exports to North America and the West Indies in 1769. In the years 1772-74, immediately prior to the American Revolution, Virginia and Maryland were the destinations of 49% of all Scottish tonnage, and if North Carolina were added the figure rose to 56 per cent. Tobacco accounted for 81% of Scottish re-exports of foreign produce and for 52% of all Scottish exports in 1762 (figures in J.M. Price 1954: 299-300, 1967 ed). (According to Mackenzie

(1957: 283-4) and Nichol (1966: 99) one firm of this period, Stephen Mitchell and Son, founded 1723 and a founder-member of the Imperial Tobacco Company in 1901, has continued in business; this however, appears to be based on a misunderstanding, for Mitchell's were founded at Linlithgow, west of Edinburgh, in 1723 and only moved to Glasgow in 1825 when Blackness, the port for Linlithgow, was no longer permitted to import tobacco (Anonymous n.d.[3]: 47). In fact, the year Mackenzie wrote, Mitchell's were amalgamated with W.D. and H.O. Wills (Anonymous n.d.[3]: 46, 53; Alford 1973: 443).

The tobacco trade stimulated economic growth in Scotland by establishing a market overseas for Scottish goods and by building Glasgow's commercial trade, and tobacco-made money made a major contribution to the industrial revolution in the Clyde valley (Ashton 1948: 58); but it brought direct wealth only to a few, and most of the tobacco was always for re-export - out of 4,000,000 lb imported in 1724, 3,000,000 were re-exported (Mackie 1964: 292, 1969 ed) and in 1771 almost 300,000 lb more were re-exported than was imported, the latter figure, as noted above, being slightly over 47,250,000 lb (Stevenson 1973: 20; cf Andrews 1955: 110, where it is noted that three-quarters of English tobacco imports in 1722 were re-exported as far as Russia, Maderia, Italy, and the East Indies). Glasgow's real industrial progress with its attendant increase of population began in the 1780s with the textile - principally cotton - industry and as that declined in the period 1830-60 it was replaced by the heavy coal and iron industries which came to characterize Glasgow.

In the earlier part of the C18 Glasgow drew admiring comments from more than one traveller. Burt, for example, writing in the 1720s, opined that Glasgow was "to outward Appearence, the prettiest and most uniform Town that I ever saw; and I believe there is nothing like it in Britain", though he also observed that "the extreme Parts of the Town are mean and disagreeable to the eye" (Burt 1754: I, 25, 1876 ed). Although its population more than doubled between 1708 and 1763 - the estimates for these years are 12,000 and 28,300 respectively - it was not until the 1770s that the population began to rise rapidly. It was in the last 30 years of the century that road and canal development, and the improving of the Clyde navigation, boosted Glasgow imports and exports. It was not until 1749 that the first wheeled vehicle travelled the 44 miles from Edinburgh to Glasgow, and it took two days to do so. By 1760 the journey still took a day and a half; in 1799 it took nine hours.

Undoubtedly, improved communications played a major part in the rise of Glasgow industries, as they did in other centres. By 1780 the population of Glasgow had jumped to 42,000 and by 1791, 66,000; by 1800 slum areas had already appeared and in the first official census - 1801 - the population was given as 77,000. However, it was not until the 1820s and 1830s that the grim and sooty appearance familiar to industrial cities began, as heavy industry became part of the Glasgow economy.

In 1811 the population was 101,000; by 1831 it had doubled, by 1861 it had almost doubled again, and by 1891 it stood at 566,000. The detailed figures are as follows:

*1708	12,000	1831	202,000
*1763	28,300	1841	256,000

*1780	42,000	1851	329,000
*1791	66,000	1861	396,000
1801	77,000	1871	476,000
1811	101,000	1881	511,000
1821	141,000	1891	566,000

(*estimate)

(Except where otherwise noted, references in the preceding paragraphs have been based on the SA vol 5 (1793) 497-506; Hamilton 1932; Eyre-Todd 1934; J.M. Price 1954, 1967 ed; Third SA vol 5 (1958); H. Hamilton 1963; Marwick 1964; R.H. Campbell 1965; Nichol 1966; Youngson 1966: chapt II; Stevenson 1973).

As previously stated, the Glasgow pipemaking industry appears to have grown only slowly in the early C19, when Glasgow's population had already been rapidly expanding for two generations, and prior to 1800 pipemaking appears to have been a very minor trade. There is a passing reference (R.L. Wilson 1961: 132) to the Glasgow industry going back to the C17 - the source for this statement is probably a reference by Fleming (1923: 119) to a James Colquhoun, apparently the earliest-known potter in the Calton area of what is now Glasgow, who petitioned in 1668 to be allowed to make pottery and whose works were said to make red clay tobacco pipes from a local clay found at Lumlock, to the NE of the Calton. Fleming also records (1923: 132) that in the Corbals area, on the south side of the Clyde, a John Holden set up as a potter using the local Shawfield clays in the early part of the C18 and included red tobacco pipes among his products. The factory, according to Fleming, closed in 1781, having been a "prosperous and well-known place". In 1783 an Arthur Halliday is recorded as a "pipemaker", possibly a tobacco-pipe maker, in a trade directory: this is the earliest Glasgow directory, and none of the four others which appeared between then and 1799 list any tobacco-pipe makers.

It should be noted that Glasgow had two local beds of boulder clay, one in the Calton area along the line of the Gallowgate - on the north side of the river - and the Shawfields and Polmadie deposits on the south side. Both these areas were used by local pottery industries, particularly the Calton area, which was adjacent to the Camlachie coal deposits. From the middle of the C18 this area became industrialized - a map of 1778 shows the Calton to be full of potteries. For ware which required better clays than the local red clay, Carrickfergus clays, apparently ballclays (see 2: IX) - were imported from Ireland. These were the clays used for Liverpool and probably Bristol tin-glazed earthenware. However, Devon ballclays appear to have been substituted later.

The Calton and the immediately surrounding area is where most of the Glasgow pipemakers of the C19 are found. By this time ballclay was being used for these pipes and not the local clay, but it seems probable that in Glasgow at least the pipemaking and pottery industries originated with local deposits of clay and coal. Once established in the area these industries would tend to stay even when clay had to be brought from elsewhere. Further, the Calton did not become part of Glasgow until 1846, and indeed did not pass beyond an essentially village organization until 1817 when its first provost was elected (Fyfe 1918), so that its relationship to the city of Glasgow was like that of East London to the City (discussed later) - an area of cheap labour uncontrolled by city authorities and able to supply articles to the city at prices lower than those of the city manufacturers. In addition, pipemakers appear to have been a gregarious group - they clustered together not only in Glasgow but in Montreal, Detroit (see both below under Montreal), East London (see below), Boston (paper given by P. Wells to the Spring Conference of the Society for Post-Medieval Archaeology, Lincoln, March 1969; now in Wells 1970: 21), and Saint-Omer where the quartier des pipiers has its rue des Pipiers and rue des Blanches-Manches, the latter, as Jakowsky notes (1956: 25), descriptive of the pipemaking trade. Other Glasgow pipemaking firms worked nearby to the west in the small C18 centre of the city, by this time becoming a slum and therefore with cheap property often near the river. Only a few worked elsewhere.

In the C18, Glasgow's connections with Virginia through the tobacco trade resulted in a flourishing pottery export business with Maryland and especially Virginia. Figures for 1771 show over 37,000 pieces of earthenware sent to Virginia alone, and over 25,000 pieces of stoneware. Boston, Philadelphia, and Antigua (West Indies) also received Glasgow pottery. Undoubtedly behind this trade had been Robert Dinwoodie or Dinwiddie, Lt-Governor of Virginia from 1751 to 1758 (Lt-Governor was in effect governor, for the titular governorship was purely a sinecure given to a British peer). Dinwoodie was a founder of the Delftsfield pottery in Glasgow in 1748; his brother was Lord Provost of Glasgow in 1742 and 1743, and the two had a large family business. (Robert died at Clifton, Bristol, in 1770 (Little 1954: 234, 1967 ed).) Along with the pottery exports of 1771 is listed 309 gross of tobacco pipes. Again, 122 gross pipes are noted being shipped to America in 1795; not vast amounts, but enough to indicate that Glasgow did export tobacco pipes on some scale (cf Collard 1967: 228-9). (The preceding four paragraphs are based on Fleming 1923. As already noted Fleming can be extremely inaccurate, but until a fresh study of Scottish pottery appears Fleming is the only source, and is thus quoted here, though with reservations).

It is not suggested that using trade directories is a wholly accurate means of ascertaining the numbers of traders and manufacturers - a pipemaking firm of W. Yuile of Glasgow appears to have existed sometime in the C19, from the evidence of a pipe found near Montreal (Lemieux 1965) but no maker of this name appears in the Glasgow directories. Further, prior to the appearance of the Glasgow Post Office Directory in 1828 the number of pipemakers recorded in the Glasgow Directory varied considerably from one year to the next, varying beween one and five in the ten years previous to 1828, while in the new directory missing entries for makers actually still in business become extremely rare. However, it is fair to say that most local directories give a representative cross-section of important industries. Pipemaking could easily expand without any increase in the number of firms in business, but an increase in the number of firms is an indication of an expanding industry (not necessarily a stable one). A decrease in the number of firms is not necessarily a sign of a declining market, for takeovers could diminish the number of firms without lowering production - indeed, if it resulted in increased efficiency it could increase production - but takeovers could also indicate the beginning of the decline in markets, with the weakest selling out first.

The number of Glasgow pipemakers remained steady between 1828 and the later 1840s at between five and seven; it then begins to rise, reaching double figures in the early 1850s. It continues to rise rapidly, reaching a maximum of 15 recorded manufacturers in 1863, and then declines as rapidly back to 10 by the end of the 1860s. From ca.1873 to 1884, however, there is another increase in makers recorded, 17 being recorded on several occasions, before the numbers enter a very slow decline, reaching 10 again in the early 1900s. A very rapid descent from 10 to 6 occurs in the period 1908-1913, the figures then remaining steady until 1920. From 1920 onwards the number of pipemakers very gradually declines and in 1939 reached three, a figure which remained until 1950. There is thus a rather curious picture of a sudden initial rise and fall in the industry in the 1850s and 1860s and another, longer, period in the 1870s and 1880s when the industry in Glasgow was at its height. Unlike the industry in, for example, Edinburgh, Dublin, or Montreal, there was no sudden decline following this period; rather, a protracted decline from 11 makers in 1889 to one for the last 12 years (1955-1967) of the industry.

When seeking reasons in the economic and social background of the city the most obvious point is that despite the tremendous growth of Glasgow from the end of the C18 through the first half of the C19, the pipemaking trade becomes prominent only in the 1850s. The period 1841-51, however, does see an exceptionally high increase in population - 73,000 - and this is undoubtedly occasioned by the great Irish influx in the 1840s following the potato famine. Only a few Irish names occur among those of Glasgow pipemakers, but in view of the known predilection of the Irish latterly for clay pipes it seems certain that the temporary jump in the number of pipemakers recorded in the 1850s and 1860s is due to the Irish immigrants stimulating demand. It seems reasonable to assume a timelag between increase of population and increase of pipemakers, for those already in the trade would expand to meet the rising demand and then be followed by those - possibly craftsmen with these firms - who decided they could profit from the increased demand by setting up their own firms. For example, Duncan McDougall, founder of the famous firm with his name, left Murray's, another big Glasgow firm, where he was manager, to set up his own business in 1846. The fact that a quite high proportion of firms - or individuals, the directories do not differentiate - lasted only a few years, however, tends to confirm that pipemaking could be a very speculative business, and this is noticeable throughout the C19. Indeed, the period with the greatest number of firms failing after a year or two is 1870-85, precisely the period of greatest apparent prosperity.

That unusually large population increases may have helped the Glasgow pipemakers' trade is suggested by the apparent prosperity in the 1870s and early 1880s, for the period 1861-71 saw an even greater increase in population - 80,000. Again, a timelag between increase of population and increase of makers seems reasonable.

Before the 1880s brier pipes and to a lesser degree cigarettes were common in England, and allowing for a probable delay in these items reaching Scotland it might be possible to postulate their arrival there by the 1880s in sufficient quantities to make themselves felt on the Glasgow clay pipe trade. There is some supporting evidence of this, for the first hint of diversification in the trade comes with the White trade directory entry of 1872 where they advertised as tobacconists and fancy-goods merchants in addition to being pipemakers. The following year the A. Coghill firm were noted as importing meershaum and French pipes and as cigar merchants (presumably in addition to making their own clays). German pipes are added to the list in 1880. The first mention of briers is in 1879 when White's are noted as importers. Other firms appear subsequently specializing wholly as suppliers of meerschaum, French, "fancy", and "patent" pipes, suggesting the decline in the traditional clay pipe business was being accelerated by an interest in luxuries as well as the advent of the brier pipe and other means of smoking such as the cigarette. Archibald A. Percy of the Trongate, for example, first advertises somewhat obscurely as an "agent" among the pipemakers in 1867, but in 1879 is advertising "French clay pipes". Thereafter he appears regularly until 1901, advertising variously "clay pipes, by a new patent system of smoking tobacco", "patented specialities only", and "patent Ivanhoe tobacco pipes". At one time he also lists a London address, suggesting a major business, and during the period 1892-98 he is on Sauchiehall St, the major city business centre. By the time he disappears a number of brier, meerschaum, and "patent" pipe-suppliers have appeared, indicating the changing trend.

Some of the traditional clay pipe firms advertised they supplied clay, or in the case of John Waldie and Co. in 1909 and 1910, were also "bath brick and firelighter merchants". Curiously, White's do not advertise themselves as oversea suppliers until 1884 ("for foreign, colonial, and home trades") nor McDougall's until 1891 ("for export and home trades"), again perhaps because markets were contracting and increased advertising was felt necessary.

Evidence from the Edinburgh clay pipe industry (R. Hill 1964), which reaches its height between the later 1860s and the late 1890s, especially ca.1874-90, again indicates a height of popularity for the clay pipe a generation or more later in Scotland than in England - Oswald (1970b: 228) notes that the majority of English manufacturers finished in the last quarter of the C19. Unlike the Glasgow industry, the Edinburgh industry in the C19 has a slow and steady increase in the number of makers from 1817 and a fairly rapid decline from ca.1895 to 1919 by which time there was only one firm, Christie's (a branch of the Glasgow Christie's), which continued making pipeclay blocks for whitening doorsteps until 1962, though it appears to have ceased making pipes ca.1942.[3] (In 1904 Christie's of Edinburgh were described by a contemporary as being the largest firm of their kind in Britain, making 100,000 pipes a week (Anonymous 1964b), a figure which suggests - using a daily average production rate of three gross of 144 each - that the firm employed ca.38 moulders. Allowing one trimmer for every two moulders, which was probably standard (cf Walker and Walker 1969: 135; also p.140 above), the firm must have had ca.57 workers, plus those involved in preparing the clay, in potting (placing the unfired pipes in saggars), firing, packing, and local distribution (see p.152 above), and the supervisory and clerical staff - probably ca.70 employees all told. This suggests the figure of 20 workers for the firm apparently at about this time given elsehwere (quoted in I. Knight 1961: 34) is much too low - possibly it relates to a later period, perhaps after WW I. (Knight is quoting Miss Christie, who with her brother carried on the Christie business until it closed, but the implication that Miss Christie's grandfather ran the business at the time the 20 workers were employed must be inaccurate, for it was Miss Christie's father, William Christie jr, who ran the firm from its founding in 1894, William sr having established the Edinburgh firm as a branch of his Glasgow concern; further, Knight is also inaccurate in saying that Miss Christie's firm made pipes for 100 years - it was the *family* which was in business for a century, William Christie sr having founded the Glasgow firm in 1857 and the Edinburgh branch outlasting the parent firm, which closed in 1950, by 12 years (Anonymous 1964b).) In any event, however, one of the last two McDougall's of Glasgow workers in 1967 recalled that firm having 150 workers as late as 1914, when she joined (Walker and Walker 1969: 145; also p.566 below), and White's of Glasgow, McDougall's great rivals, must have had about the same size of staff, so the claim that Christie's were the largest firm of their kind at the beginning of the C20 must certainly be exaggerated.)[4]

According to that unreliable source Fleming (1923: 236-7), Glasgow during the latter half of the C19 was an important centre for trading pipes abroad, while Edinburgh supplied the home market. Here Fleming may be correct, for Glasgow pipes have been found in North America from the Atlantic to the Pacific and from northern Ontario to Arizona (e.g. I. Walker 1966a and refs; I. Walker 1970a: 101, 104-5 and expanded version 1971d: 23 and 25) and probably from Alaska (VanStone 1972: 68-9, 65 pl 13,5), in the Caribbean (Omwake *in litt.* December 1966; Oswald 1968: *passim*; 1969: *passim*), in Guyana (former British Guiana) in South America (undated clipping of letter in a January 1975 issue of Edinburgh *Evening News*), in Ghana (Calvocoressi MS), on Easter Island (Oswald *in litt.* 2 January 1969), and in Australia (Pretty *in litt.* 28 February 1968; Allen *in litt.* 11 and 18 March 1968; Birmingham (ed) 1971: 5th page); while Edinburgh-made material seems to have found its way abroad only rarely, occurring in the form of a few products of the firm of Thomas White (fl 1823-76) found on a number of North American sites - Signal Hill, St John's, Newfoundland (material in collections of the Research Division, National Historic Parks and Sites Branch, Ottawa); Portland Point, Saint John, New Brunswick (Barka 1965: 443); Fort Coteau-du-Lac, Quebec province, ca.45 miles SW of Montreal up to the St Lawrence (material in collections of the Research Division, National Historic Parks and Sites Branch, Ottawa); Fort Wellington at Prescott, Ontario, on the St Lawrence (material in same collections); Old Fort Henry at Kingston, Ontario, at the junction of Lake Ontario and the St Lawrence and guarding one end of the Rideau Canal (noted by B.M. Mitchell *in litt.* 2 August 1969): at two upper Ottawa valley sites, the Montgomery Lake site Number 4 on the Petawawa river east of Petawawa, Ontario (B.M. Mitchell *loc. cit.*) and Fort Témiscamingue near Ville Marie on the Quebec side of the river ca.45 miles north of Témiscaming (material excavated by the Research Division of the National Historic Parks and Sites Branch 1971); and at the Ermatinger House at Sault Ste. Marie in northern Ontario (Reid *in litt.* 14 October 1974) all in Canada (cf I. Walker 1970a: 102 and illus. and 1971d: 25, 26-7, pl 3); with single examples known from two sites in the United States, Indian Island at Old Town in Maine (Fox 1972: 33), and on the opposite side of the continent English Camp on San Juan Island, Washington state, an island which was British until ceded to the United States in 1872 (L. Hudson 1975: 84). A bowl marked TW is in the Thóðminjassfn-Íslands, Reykjavík (seen there by this writer 18 November 1971), but as noted in 2: VII a number of Scottish firms, including ones in Glasgow, were producing different "T.W." pipes by 1900 (e.g. a whole Davidson of Glasgow TW-marked pipe bearing the type number 152 from a collection in the Hamilton area, southern Ontario (T. Kenyon *in litt.* 15 June 1972) - a 1900 price-list of Scottish pipes lists Davidson's number 152 as a "Long T.W." and costing 8-1/4d a gross (Anonymous 1900: 38), an about-average price for the time for the normal run of clay pipe), and it appears that the Edinburgh White's products had been sufficiently popular to warrant plagiarization. One cannot, therefore, attribute this bowl definitely to White though it is very likely to be Scottish in origin.

When this Glasgow export trade commenced is not yet clear, but it was certainly before 1850, for "Scottish clays" were being shipped to Montreal in 1842 (Collard 1967: 10 and 407 n.23) and a large number of McDougall pipes as well as lesser numbers of other Glasgow-made pipes were found at Old Sacramento City, California, a site historically dated to 1846-52 (Humphrey 1969: *passim*). This indicates that McDougall's, founded in 1846, immediately made an impact on the export market. Further, Murray pipes have been found in North America, Australia, and on Easter Island, and as this firm became that of Thomas Davidson jr and Co. between 1861 and 1863, presumably Murray-marked pipes ceased to be sold very soon after these dates. Murray pipes were supplied to the Hudson's Bay Company in 1858, though this was an isolated instance (Krause 1969-70). The reference to Scottish pipes being exported to Montreal in 1842 noted above may in fact indicate the beginning of Glasgow's pipe trade with North America, for that reference is to a shipment to Robert Anderson, a Glasgow pottery-salesman who had emigrated to Montreal in 1840 and was to make such a success of selling imported pottery and pipes, particularly Glasgow-made wares, that he was able to retire in 1854 and die 42 years later a millionaire (Collard 1967: 87-8 and footnotes).

A White-made stem was found on an unidentified Indian site abandoned in 1827 (R.L. Wilson 1961: 129 n.31); unfortunately this need not indicate that the stem belongs to the period of the site, though White's made pipes from 1805 to 1955. At Signal Hill, Newfoundland, almost all the marked stems belonged to McDougall - there were only rare examples of Morgan of Liverpool and Murray and White, both of Glasgow, and a single example of Prince of Gouda; there was no Montreal-marked material at all (Jelks 1973: 69, 72-75). At Coteau du Lac, Quebec, on the other hand, 63 White pipe-fragments were found, as opposed to only 31 McDougall fragments. Further, 63 A. Coghill pipes were also found (*ex info.* Miss E.A. Wylie). At the Ermatinger House at Sault Ste. Marie, Ontario, however, the largest number of marked stem-fragments were those of Murray of Glasgow, of which there were 37 as opposed to only 3 White of Glasgow-marked fragments and none at all marked McDougall (the only other non-Montreal marked material was one Scotland-marked fragment - almost certainly Glasgow-made - 2 examples of White of Edinburgh-marked fragments, and single examples of Peter Dorni and Gambier stems) (Reid *in litt.* 14 October 1974). In the London Post Office

Directories towards the end of last century McDougall's advertise themselves as the "largest export manufacturers in the world" while White's call themselves the "largest manufacturers...." which suggests McDougall's, at least latterly, specialized in the export market. Both McDougall's and White's had London offices, the former from 1878, the latter from 1884, though Davidson's had one before either, opening theirs in 1869.

In 1891 the United States made it mandatory for imported items to have their country of origin marked on them (Fontana et al. 1962: 93) - hence McDougall's pipes destined for export in 1967, such as their TDs, had SCOTLAND moulded on their stems (Walker and Walker 1969: 135) - and presumably at this time Glasgow manufacturers replaced "Glasgow" on their moulds with "Scotland". Nearly all the Glasgow pipes in North America seen or read of by this writer have "Glasgow" on them, from which one might conclude Glasgow's pipe trade to North America had declined by 1891. At Old Sacramento City (1846-52), some McDougall-marked stems were also found marked GLASGOW SCOTLAND or just SCOTLAND and others had no place marked on them though McDougall's name was on the other side. This might suggest that several versions of marking, including the use of SCOTLAND, were in use prior to 1891; there must, however, have been at least a minor amount of intrusive material at this site, for a single Davidson stem was also found and as already indicated this cannot be earlier than the period 1861-63.

Some McDougall pipes from two Ontario sites, Longlac Trading Post (Dawson 1969: 45) and the Montgomery Lake site Number 4 in the upper Ottawa valley (B.M. Mitchell in litt. 2 August 1969) were marked GLASGOW SCOTLAND, but neither set of finds can be closely dated. At Longlac Trading Post four McDougall stems were simply marked GLASGOW as were eight W. White stems, but one White pipe was marked SCOTLAND (Dawson 1969: 25 fig 6, 43, 45). A fragment marked WHITE & S[ON] or S[ONS] from the York I site, near York in the Niagara peninsula, southern Ontario, had [GLASG]OW SCOT[LAND] on the reverse (T. Kenyon in litt. 15 June and 18 July 1972). At least one McDougall pipe marked SCOTLAND was found at Portland Point, New Brunswick (Barka 1965: 443), but its context is not known; another was found at Fort Ingall, Quebec province (Samson and Michaud 1969: 63 photo 8 and caption), though not necessarily belonging to the period of occupation of the fort, which was 1839-62; others occur at Pemaquid, Maine (seen there by writer November 1972); another came from Fort Nonsense, New Jersey, a Revolutionary War site (Skinner in litt. 13 June 1972; cf Rutsch and Skinner 1972: 43), but obviously from a post-occupation context. Several McDougall and White pipes have been recovered from Port Royal, Jamaica, in unknown contexts (Oswald 1968: App. B passim; 1969: 61, 63, App. B passim), but only one - a White product - had SCOTLAND instead of GLASGOW. However, one McDougall pipe marked SCOTLAND was found at the Booth Brothers knife factory at Stockholm, New Jersey, which was occupied 1889-1903 (Lenik 1969: 34).

At Fort Ticonderoga, New York state, a stem fragment marked McL- and -TLAND was found (Gifford 1940: 123 pl IV fig 35) - again the context is unknown but it obviously does not belong to the period of the fort's use, which was in the mid-C18. If the maker was a Glaswegian he is perhaps most likely to have been T. McLa(u)chlan, recorded from 1887 to 1938 (other Glasgow alternatives are McLuckie and Prentice, 1873 and 1874, and McLuckie and Fenton, 1875 to 1877; there appear to be no Edinburgh makers whose names would fit).

Being a major oversea port, Glasgow was well-placed for exporting her pipes, while Edinburgh was not; and the large Glasgow export trade in clay pipes which continued in attenuated form until McDougall's closed in 1967 (Walker and Walker 1969: 145-6) explains why the Glasgow industry declined so much more slowly after its heyday was over than did the Edinburgh industry, which had to rely solely on home demand for its prosperity. As noted in 1: VII(h), smoking in all forms but especially pipe-smoking, was increasing rapidly in the United States during the second half of last century, as was the population of that country. This must have meant a major market for Glasgow pipes, and one where they were apparently able to beat off the challenge of native North American white clay pipe industries such as those of Montreal and Detroit.

Low prices of Glasgow pipes in the middle of the last century may have been a contributory factor to the Glasgow industry's export success, for its 21-ins best-quality pipes were being sold for 3-1/2d a dozen at a time when some cutties in London were costing 3d a dozen; but this cannot be the whole reason, for Edinburgh pipes were just as cheap and certainly by the 1860s while the superior Broseley products of comparable length were more expensive at ca.4-1/d-6d a dozen, Bristol long-stemmed pipes were being sold at prices strictly comparable to those for Glasgow pipes (for figures see 5: I). One must also assume, therefore, a reputation for good-quality products. In addition to their North American market Glasgow pipemakers were exporting to West Africa at least by the 1880s (Hume in litt. 7 November 1967) and McDougall's of Glasgow were sending pipes there not only up to WW II (Walker and Walker 1969: 146) but after it and until they closed, for among the losses noted in the winding-up of the firm following its closure in 1967 was that of goods caught up in the Nigerian civil war (Rodger in litt. 24 July 1969).) Both McDougall and Davidson pipes have been found on a site in Ghana (Calvocoressi MS). Glasgow pipemakers also exported, as already noted, to Australia.

Rather curiously, neither World War appears to have contributed to the lessening in number of firms working in Glasgow. The only rapid contraction of the pipe industry there occurred in 1908-13. More curiously, the recession in the 1930s made little discernable impact-1931 saw the number fall from five to four and 1939 saw the number reduced to three.

Why both Edinburgh and Glasgow clay pipe industries apparently started so late remains uncertain. Tobacco was certainly known in Scotland quite early, for a book entitled Nepenthes, or the Vertues of Tobacco, dealing primarily with its medicinal value, including smoking, was published in Edinburgh in 1614 (Fairholt 1859: 86-7), 71; Penn 1901: 223; Apperson 1914: 52-3) and on 7 November 1616 a Capt William Murray obtained a patent giving him the sole right to import tobacco into Scotland for 21 years (Chambers 1858: I, 527). At some time, presumably prior to granting Murray his patent, James VI had forbidden the importation of tobacco into Scotland, but this ban had been evaded and "the country was ever universally filled with tobacco, and public and common merchandise made of the same". James had then imposed a duty of 20s Scots (1s8d sterling) per lb on tobacco, but this had merely resulted in smuggling. On 30 July 1622, therefore, the Scottish

Privy Council had once more prohibited the importation of tobacco, under penalty of confiscation by his majesty. Murray's monopoly was apparently overlooked when this ruling was made, for the following November it was explained that James had not meant to "deprive his loving subjects of the orderly sale and moderate use of tobacco" but only to prevent abuse and excessive use, and that the late Capt Murray's monopoly still stood, the prohibition holding only against those who did not possess a licence under this monopoly. In March 1623 it was arranged that tobacco importers should pay Murray's representatives a duty of 20s Scots per lb of tobacco. The following year, however, Murray's widow and daughter turned over the patent to royal commissioners in return for £20,000 Scots (£1,666 13s 4d sterling) paid in three half-year instalments (Chambers 1858: I, 527-8). Tobacco was apparently being grown at Dunrobin Castle, Sutherland, in the extreme NE of the country, before 1630 (quoted in Mackenzie 1957: 119-120; this association is probably based on a label in a case in the museum at the castle - Adam *in litt.* 26 June 1970). The fourth Earl of Montrose, who died in 1626 (*DNB* XXII, 335), was "a devotee of tobacco" (Buchan 1928: 34, cf 374), though it is not clear from this description how he took his tobacco. In 1634 Charles I gave a monopoly to two Scots, Sir James Leslie and Thomas Dalmahoy, the latter a servant of the Marquis of Hamilton, to sell licences to retailers of tobacco in order to ensure a good quality of tobacco and reduce the great abuse resulting from its "ungoverned sale and immoderate use" in Scotland, though it proved extremely difficult to enforce the monopoly (Chambers 1858: II, 74). According to R. Spence (1957: 20), the Scottish parliament revoked this monopoly in 1641, but in 1669 Charles II, in the course of distributing various monopolies in Scotland, allowed Sir John Nicholson of Edinburgh to put a tax on tobacco, causing a contemporary historian, Sir George Mackenzie, to observe that "custom [having] made tobacco as necessary as nature had made meat and drink,...this imposition was as grievous as if bread or ale had been burdened" (quoted in Chambers 1858: II, 332). In 1674 one Andrew M'Kairter, after having learnt the trade in Newcastle upon Tyne, London, and The Netherlands, set up as a tobacco-spinner in Leith, the port of Edinburgh (Chambers *op. cit.* 346-7).

None of these references indicate how tobacco was being used, but an anonymous English observer, in an account published in 1702, noted that the Scots were "fond of tobacco, but more from the sneesh-box [snuff-box] than the pipe" (quoted in Chambers *op. cit.* 494); while Edward Burt, writing in the later 1720s, noted that apart from the use of pipes at wakes (see p.349 n. 6 below), "it is very rare to see any Body smoke in Scotland" (Burt 1754: I, 230, 1876 ed), snuff being the Universal method of taking tobacco. A story noted in Mackenzie (1957: 169) and apparently current in Germany about the beginning of the C18, that the brains of Scottish soldiers of fortune killed during the Thirty Years' War, 1618-48, were found to have soot on them, perhaps reflects a memory of Scots being noted snuffers even before the middle of the C17 (for a discussion of this story, and other Scottish associations with snuff, see 1: VII(b)).

In 1619 a William Crawford of Camlarg who had been attempting at great personal expense to start a glassworks in Scotland, and who had discovered together with a William Hay son of William Hay of Mayne many deposits of clays suitable for making "pottis for glaswarkis, tabacco pypis, and sindrie uther vessellis and engynis maid of clay" hitherto imported, was allowed together with Hay to have the sole right for 21 years to exploit these deposits and export the clay to England. Crawford and Hay were to pay the king 4s Scots for every ton of clay transported, but it was provided that if during the 21-year period "any warkis erectit in any pairt of the said realme of Scotland for making any pypes, pottis, or vessellis of clay" near the deposits being exploited were being interfered with by the removal of this clay then the Scottish Privy Council could intervene. (It is also noted that on the expiry of this monopoly, no further monopoly on clay would be entertained from anyone.) Later in the same year, Lord Kinclevin, his heirs, and assignees were granted "secluding all utheris" to make "all sorte of earthin vessellis and wark of clay, tyill, marrill, not heirtofoir practiseit within this kingdome, and dispose thairupoun ather in or without the said realme." This was promoted in order to give employment within the country and to discourage money leaving the country to buy foreign goods; Lord Kinclevin was to bring in foreign workmen, and while the privilege would not prevent anyone from manufacturing earthenware "that they have beine accustomat and in use to mak at any tyme bygane" all those who broke his monopoly - obviously on more sophisticated wares - would be liable to confiscation of "haill veschellis, tobacco pypis, and utheris" (*Register of the Privy Council of Scotland* vol XI (1613-19) 584-5 and 604). This implies that pipemaking was one of new trades "not heirtofoir practiseit" which Kinclevin planned to introduce.

Where Kinclevin proposed to obtain his workers from is unfortunately not stated - an unpublished pipe-stem fragment in the National Museum of Antiquities of Scotland pipe collection with the mark of a fleur-de-lis within a diamond suggests Dutch contracts, for such marking is known to have been characteristic of many Dutch C17 pipes from ca.1630 (I. Walker 1971c: 111, 114-5 and refs; date quoted in Omwake 1959: 134; see also illustrations in Düco 1974: figs 9-13A, 16, 18, 24-25; for recently-recovered examples from two Dutch shipwrecks, one off Shetland in 1653, the other off Western Australia in 1656, see respectively Sténuit 1974: 236, fig 18 lower and Green 1973: 283, fig 13,A). However, this mark is known on early C17 pipes from the London area (Oswald 1960a: 50; 1961: 56) from where the original emigrant pipemakers to The Netherlands probably came, so its presence in Scotland might indicate early London influence. Nevertheless, a decorated stem from Linlithgow west of Edinburgh (Laing 1968: 127 fig 7, 19) is very similar to one from Colchester of ca.1650-80 showing strong Dutch influence (Gant 1961b: 9, 10 fig 37,3A); and other decorated stems from Linlithgow (Laing 1968: fig 7,16-17) have similar Dutch-style decoration - including one stem with the maker's name - to that noted at Nottingham (see I.II(g)). The National Museum of Antiquities of Scotland also has pipes with three-letter marks, which is a typical Dutch mark, and bowls with Dutch style "rose" decoration on the lower sides (Oswald 1970a: 140); and a very debased copy of the Dutch Sir Walter Ralegh pipe (see pp19-20 above) is known from Edinburgh (Oswald *in litt.* 4 and 11 October 1972), quite possibly a local attempt at copying the Dutch original form. Oswald notes Dutch influence in the C17 at Edinburgh as well as Kingston upon Hull, Plymouth, and possibly Ipswich (Oswald 1970b: 231, 241, pl 205 fig 26). Certainly, among the clauses in the charter of the Westminster Pipe Makers' Guild, drawn up in 1619, was one forbidding the importation of pipes from overseas or from Scotland (PRO C.66/2206 Patent Rolls 17 Jas. I, 5 Oct, No 6), which suggests that pipes may have been made in Scotland that early - they were certainly being made "overseas" (in The Netherlands) before that date (see 3: II). (H.E. Smith (1860: 213) talks of the industry at Kingston upon Hull and Beverley in Yorkshire dating to the C16 and apparently indicates apprentices from this area spread the trade, one setting up in Loughborough ca.1600 and another, Thomas Barrick or Berwick, setting up in Edinburgh about the same time and marking his pipes TB on the bowl facing the smoker. No source is given for these statements.) The accounts for May 1651 of a minister near Glasgow, if the Scots currency is correctly converted, indicate that tobacco could be obtained for the equivalent of ca.5d a lb, while an English diary of 1656 gives a price of 6d an oz (Penn 1901: 68). How the Glasgow tobacco was used is not stated. As noted earlier, Scottish-owned ships were not permitted to trade with English colonies before 1707, though there is evidence that they did and that tobacco was brought in without paying English duty (e.g. Rive 1929: 556-8), which accounts for the extremely low price recorded, as Scots duty on tobacco was low. (As late as 1722 tobacco smuggled through Glasgow could be sold in London and Bristol at a price less than the duty chargeable - a price of 5-1/2d a lb when duty alone was 6-1/2d a lb is one example given (Rive 1929: 565).) How plentiful and regularly supplied tobacco is likely to have been in the C17, is, however, perhaps a different matter (cf I: VIII(b)).

One Stephen Bell is recorded as a pipemaker in Edinburgh in 1649, and in 1650 one of the indignities inflicted on the first Marquis of Montrose (son of the Earl noted above) as he awaited execution by the Parliamentarians in the Edinburgh Tolbooth was that his guards incessantly smoked in his presence (Buchan 1928: 374-5) - unlike his father, he was unable to tolerate tobacco smoke.[5] Another pipemaker, a William Young, was apprenticed in Edinburgh in 1653 (NMAS files) and in 1669 took John Biggar apprentice for seven years, but these are the only C17 pipemakers recorded in Edinburgh by R. Hill (1964) and none is yet known from the C18, though Apperson (1914: 242) records an C18 Edinburgh tobacconist's sign of two pipes crossed, which suggests pipemaking then was at least not uncommon. However, as noted above, Edward Burt, writing in the later 1720s, observed that except at wakes it was very rare to see anybody smoke in Scotland. According to Bain (1896: 90-1), who unfortunately does not give references to his anecdotes, Robert Burns, 1759-96, smoked a pipe as well as taking snuff. Prince Charles Edward Stuart, the Young Pretender, is recorded smoking during his flight in 1746 (quoted in Mackenzie 1957: 173-4), and while he was no Scot by upbringing his French education would certainly not have encouraged pipe-smoking at a time when it was very much a lower-class custom there (3: V), so that it may have been a habit picked up during his flight. Fleming (1923: 236) says that Edinburgh-made pipes were taken on the unsuccessful Darien expedition in 1698, and although Fleming is an unreliable source he is correct in this instance, for it is noted (Burton 1897 ed: IV, 43 n.1, 34-5) that Edinburgh clay pipes were taken by this expedition and that The Company of Scotland trading to Africa and the Indies, which organized the Darien expedition, ordered 29 barrels of clay pipes, made of the "best white clay" from one David Montgomery (Prebble 1968: 97, 98) - Prebble also notes (1968: 25, 28) that tobacco and pipes were used at the formative meetings on the Darien scheme.

Unfortunately, there has as yet been little excavation of medieval and post-medieval sites in Scotland (see Laing 1969 for a review and bibliography of Scottish sites dating between Norman times and the Clearances; cf also Crawford 1968). Fairbairn (1927), excavating the site in Ayrshire of the house of John Brown the Convenanter who was shot in 1685, noted "upwards of eighty whole and very small tobacco pipe-heads of clay, all with broken stems and suggestive of a time of solitude and seclusion" but he also noted that the building had been removed early in the C19, that C17 and C18 and later pottery had been found, and that eight coins ranging in date from the mid-C17 to the end of the C18 were also found, so the pipes (which he does not illustrate) cannot be attributed solely to the C17 with any confidence. From a more recent excavation at the deserted village of Rossal in Sutherland (Fairhurst 1969) of a site probably occupied for the last 30 or so years before the Clearances of 1814-18 no pipe- fragments are noted at all, though a variety of other material was found; a similar state of affairs appears to have existed at sites of approximately the same period at Lix, Perthshire (Fairhurst 1971). Pipes datable typologically to the C17 and early C18 are found in Edinburgh and SE Scotland: among the makers' marks on the earlier pipes is the triple-towered castle which is the Edinburgh coat of arms (PSAS LXI (1926-7) 12; I. Knight 1961: 32; Dunbar and Hay 1963: 207, 208, and refs; Dunbar 1965: 244, 245; Laing 1968: 126-8).

As previously noted, there was a minor Glasgow industry in the C17 and C18 (using at least to some extent the local red clay, not ballclay, which was used for the Edinburgh pipes noted above). Thus there is evidence for a clay pipe industry in Scotland prior to 1800, but it appears to have been a very minor one. (In The Heart of Midlothian, Scott has a character smoking a short iron pipe - the incident is dated 1737 but whether Scott based it on fact or not is unknown (Apperson 1914: 230).)

However, one reason for the scarcity of pre-1800 pipemakers in Scotland may have been the apparent popularity of snuff with Scots in the C18 already noted (Fairholt 1859: 251, 274-84, cf 135; Larwood and Hotton 1866: 421; N&Q 24 July 1875: 67; Laufer 1924b: 41-2; Heal 1947: 167-70; R. Spence 1957: 21; Meadows 1957: 42-5; Nichol 1966: 9-10). The possibility that snuffing largely took the place of smoking until relatively late gains some support from the Irish evidence noted earlier. The whole field of tobacco consumption in both Scotland and Ireland will certainly prove to be a research project in itself.[6]

It appears, therefore, Glasgow (and Edinburgh and Dublin) can be added to the prevously-listed centres of pipe production as places where local influences played at least as large a part in the industry's rise and fall as more widespread influences. The industries in Glasgow, Edinburgh, and Dublin rise at a time when the industries in England are on the decline and reach their maximum prosperity during the last third of the C19 when the industry was very much dying elsewhere in Britain. Why they should have this pattern is not wholly clear, but in the case of Scotland it appears not to be directly connected with the rise of industry, for that had started well before 1800. In England there was a shift in the centre of gravity and pipe manufacture from the southern areas to the north in the early C19 (Oswald 1960a: cf fig 18 p.45 and fig 19 p.46) which appears to follow the rise of industry in the north, but with the rapid rise in population there (and the more accessible references to pipemakers in directories) it is difficult to say whether this rise in pipe-production is relative or absolute.

Certainly the rise in popularity of pipe-smoking in Ireland can hardly be ascribed to an industrial revolution; and still less to an increase in population, seeing that the period of maximum popularity of clay pipes - as evidenced by the number of Dublin makers - was during the second half of the C19, a time when after an extremely rapid rise of population starting in the C18 and continuing until the 1840s, the population plummetted by millions (Freeman 1957: 50; Trevelyan 1942: 372 n.1., 1946 ed). It seems fair to say, however, that the working classes who smoked clay pipes in northern England and Scotland and the peasantry of Ireland had one thing in common - a great deal of poverty - and that in general the clay pipe became progressively more associated with the poor throughout the C19. Irish emigration to Glasgow seems certainly to have stimulated the pipemaking industry there in the 1850s and 1860s, but the fact that Edinburgh, relatively little affected by the Irish emigrations, also had its heyday towards the end of the C19, indicates that the Scots themselves took to pipesmoking on a large scale much later than did the English. According to Clapham (1926: 60, 1939 ed) the Irish emigration to Edinburgh was earlier - 1810-30. What effect this had on the pipe industry is unknown - there are no Irish-looking names among the makers recorded in Edinburgh.

Pipemaking being an industry which could be carried out in small premises if necessary, one might expect firms to change their addresses over a period of time. This is noticeable in Montreal to a very marked degree and to a lesser extent in Edinburgh, but not particularly in Glasgow. There are some grounds for suggesting that the firms which lasted a long time - the Coghills', McDougall's, White's, for example, in Glasgow - and were therefore perhaps the most stable, did not change their premises frequently. Of course, the larger the firm the less desire there would be to move and the more dislocation there would be if such a move had to be made. White's at their closure in 1955 had been in the same premises since 1824, though they had expanded their factory considerably, erecting in 1867 a whole new building from Gibson St to Bain Sq (Fleming 1923: 243). 4 Ropewalk Lane had been Coghill property for virtually the whole of their 78-year existence, and McDougall's had occupied their 18 Charles St premises for the last 78 years of their existence. On the other hand, the first five years of McDougall's business saw the firm in three different premises before settling in the third for almost 40 years, yet the amount of McDougall material found at Old Sacramento City, California, and datable to 1846-52, precisely this period of the McDougall firm's life, indicates that pipemaking could be mobile and yet flourish. In fact, as is observed later when discussing pipemaking in East London, the kiln is the only semi-permanent piece of equipment in the trade.

In some cases where there were moves, another firm would take over the old premises, which suggests that whatever the reason for the first firm's moving or closing, it is not likely that it was because of unsuitable premises unless the first firm was moving into larger or smaller premises. This same feature of a premises remaining a pipe factory over a considerable time will be noted when discussing the East London industry. To give two Glasgow examples, a pipemaker - John Watson - is first recorded at 22 St Mungo St in 1827, having been listed at number 37 since 1824. In 1831 McFarlane and Co. who are first recorded in 1829 at number 24, join with Watson to form McFarlane, Watson, and Co. at number 22; in 1833 Mrs Watson appears (from which one may assume that her husband had died and presumably McFarlane had sold out); in 1834 the occupant is given as Alexander Wylie and he is listed as a pipemaker there until 1842, after which he appears for one more year at a different address. In 1849 a James Tomilty appears; he is succeeded in 1851 for a single year by one Alexander Bain; and he in turn for a single year by Patrick McAvoy. After a three-year gap a Michael McAvoy set up as a pipemaker in 1856 with what by now must have been considered a premises fraught with ill-luck, but he is last listed there in 1860 and after a one-year gap he appears once more at a different address before disappearing.[7]

A less spectacular example is 9 New St in the Calton. The first pipemaker recorded as occupying these premises is John Boyd for the single year 1871; D. Arnot(t) is recorded there in 1880 and 1881, and he is succeeded the next year by John McIntyre and he in turn in 1898 by his wife. The McIntyre business lasts until 1903, and the following year, and for that year only, the firm of A. Coghill, unlisted since 1899, appears.

Another example, though as no number is given it is not absolutely certain that the same property is being referred to, is Ayton Place, Old Vennel. In 1807 one T. Short appears there as a pipemaker and last appears in 1811. In 1814 an M. Short is listed there as a rope manufacturer and the next year a W. Short appears as a pipemaker. (Curiously, the first reference to White - 1805 - is also as a rope maker). The next year again, however, - 1816 - it is a Mrs Short who is listed as a pipemaker there, and she continues to be listed there until 1821. There is then a long gap until 1875 when James Herriott is listed as making pipes there, and for the next two years the occupiers are given as Herriott and McIlwraith (a photograph of Old Vennel taken in 1868 and showing well the squalid living conditions there at that time appears in Butt 1971: 65). There are other, lesser, examples of this changing, but more detailed work needs to be done on ownership of these premises - there may be some significance in the apparent lack of success of the occupiers. Non-pipemaking tenants of the premises would also have to be traced. In Edinburgh, length of tenancy appears to have been generally shorter than in Glasgow, while in Montreal, as will be shown later, there appears to have been very little stability of premises indeed.

At the same time, there is evidence that running a clay pipe factory could be a profitable business. White, McDougall, and A. Coghill were all able to own houses either in fashionable areas of Glasgow or in residential areas farther down the Clyde. Some other proprietors certainly lived at some distance from their works. However, it seems likely that the majority of pipemakers, and particularly the less successful and less well-known, ran essentially home businesses and lived on the premises. They probably participated little if at all in the export trade, for virtually the only firms represented by excavated finds are the big four - McDougall's, White's, A. Coghill's, and Murray's-Davidson's.[8]

The following are the only examples known to this writer of Glasgow material from firms other than the above (all examples have GLASGOW on the opposite side of the stem from the maker's name):

stem-fragment of an otherwise unknown W. YUILE from Fort Lennox, Quebec Province (Lemieux 1965: 15);

Stem-fragment marked STUART, from Fort Vancouver, Washington state (Caywood 1955a: fig 16, p.16);

Bowl in form of a face and attached stem-fragment marked J^{N} NIM[MO] made of red clay, from Fort Beauséjour, New Brunswick (MacLean 1971: 35 fig 26);

stem-fragment marked J. NIMMO from wrecked ship at Mallerytown, Ontario (Zacharchuk and Rick 1969: 11);

stem marked D. COGHILL from Fort Témiscamingue nr Ville Marie, Quebec province, on the upper Ottawa river ca.45 miles north of Témiscaming (National Historic Sites Service collections, excavated 1971);

stem marked G. COGHILL from Michipicoten Post on Michipicoten Bay on north shore of Lake Superior, Ontario (*ex info.* G. Forma, Parks and Recreation Branch, Ontario Department of Lands and Forests, Toronto; see now Forma 1972: 43, 49);

stem marked BANNERM[AN] from South Carolina (card from collections of Department of Archeology and Anthropology, University of South Carolina, Columbia);

similar stem from Fort Union III, New Mexico (R.L. Wilson 1966: 37, fig 4,1);[9]

whole pipe, stem marked WALDIE & Co from private collection in the Hamilton area of southern Ontario, said to have been found in area (T. Kenyon *in litt*. 15 June 1972);

presumably a stem-fragment, at least one example, described only as marked D. Widson [sic] and Glasgow, from San Juan Island, Washington state, in the Strait of Juan de Fuca between Bellingham, Washington, and Victoria, British Columbia (Saastamo 1973: 88).

Caywood dates the Stuart pipe to just before 1860 and probably later: this would agree with a C. Steuart and Co. noted from 1856 to 1860 and a C. Stewart noted in 1860 and 1861 - there may be a confusion here and these firms may be one and the same - but a T. Stewart is recorded in Glasgow 1828-32, and these dates would fall within the Fort Vancouver occupation span. Various Nimmos, probably all related, are noted as pipemakers in Glasgow between the 1830s and the 1860s; a J. Nimmo appears in 1834 and a John Nimmo in 1860-65. David Coghill and George Coghill were related to the Alexander Coghills, probably being brothers of the first Alexander. George is recorded for the years 1853-72, David for 1859-98. Three Bannerman pipemakers are known in Glasgow (so far as it at present known there are no connections with the Montreal Bannermans, see following section): they are C. Bannerman noted in 1842, John Bannerman noted 1856-60, and Carrick Bannerman noted 1862-65. John Waldie and Co. are listed 1870-1929.

In addition, there is a stem marked M^{C}L- and -TLAND from Fort

Ticonderoga, New York state (Gifford 1940: 123 pl IV fig 35), which is probably a product of Thomas McLa(u)chlan of Glasgow fl 1887-1938. No Edinburgh pipemakers with a name which would fit the fragmentary inscription are known and of the Glasgow makers McLa(u)chlan would be the logical choice in view of his working almost wholly after 1891 when Glasgow pipemakers would have had to put SCOTLAND on their pipes, as indicated on this example. The only two other Glasgow firms whose names would fit are McLuckie and Prentice 1873-74 and McLuckie and Fenton 1875-77 (Appendix VII).[10] A pipe marked LISTO- from Pemaquid, Maine (H. Camp 1968: 11 fig 5,3rd btm row; not seen by writer on visit there November 1972), is most likely a product of one of the Glasgow Listons - J. Liston fl 1873 or J. Liston jr and Co fl 1877-79. One other fragment, a stem marked McAVOY LD on one side from Fort Beauséjour (MacLean 1971: 40, fig 30c), could be a product of one of two Glasgow McAvoys recorded, but no place of work is marked on the fragment as it survives and the style of marking the name is totally un-Glaswegian. A Patrick McAvoy is recorded in Glasgow in 1852 and a Michael McAvoy at the same address 1856-60 and at a different address in 1862. A John McEvoy - apparently spelt thus - is recorded in Montreal in 1851.[11]

In summary, therefore, the Glasgow industry, like the Edinburgh and Dublin industries, was of minor importance prior to 1800. The influx of Irish to Glasgow following the Potato Famine appears to have caused a temporary expansion of the pipe industry in the 1850s but the true zenith of the trade was in the 1870s and 1880s. This latter is comparable to the evidence of the Edinburgh and Dublin industries, and in marked contradiction to the industry in English centres. The industry's decline in Glasgow, unlike that in Edinburgh and Dublin, was very protracted. This may have owed something to the innate conservatism of the working class which formed a higher percentage of Glasgow's population than it did in Edinburgh, but the main reason appears to have been the continuation at an only slowly diminishing rate of a world-wide export trade. It is possible the cigar, brier pipe, and cigarette became common in Scotland appreciably later than in England; though in Edinburgh, the cultural as well as the political capital of the country, there was a cigar-shop on Princes St by 1830, hard on the heels of the first major importations of cigars into England (see I: VII(e)), and doubtless including among its customers the upper classes already moving to adjacent areas of the New Town before the encroachment of such traders on their domain (noted in Youngson 1966: 231).

SECTION V: MONTREAL

The inclusion of the Montreal pipemaking industry among those discussed may appear unusual when all the other centres discussed are British. However, as will be shown, the Montreal industry is entirely a British (very largely Irish) import - there was no French-Canadian influence. Further, the work done so far on the Montreal industry reveals a number of extremely interesting points which can be related to ones which have arisen from the study of the other centres working in the C19 - the Irish influence, the mobility of the industry and the uncertainty of the trade, its sharp rise and decline, the intense concentration of pipemakers in the same area, the sort of area where pipemakers worked, for example.

The Montreal pipemaking industry was the subject of a very brief note by the writer (I. Walker 1966d) which has now been totally superseded by more recent, unpublished, and uncompleted work. As this work is still preliminary, only a brief outline will be given here. The first recorded Montreal pipemaker does not appear until 1847, and in this year only one is recorded. From 3 recorded in 1853, the number suddenly jumps to 8 the following year and 14 the next. Between 1855 and 1877 the number stays in double figures, reaching a maximum of 18 in 1875. From the later 1870s, however, the number falls as rapidly as it arose, the last pipemaker going out of business in 1907. Only three of the names recorded are obviously French-Canadian, but a very large proportion are Irish and a cursory examination of the entries under the various streets in the pipemaking area suggests this latter feature was not confined to pipemakers. It is tempting to see in this a reflection of the great Irish emigrations of the later 1840s and the 1850s because of the potato famine. (Pipeclay is listed in an auction advertisement in the Montreal Herald of 30 April 1814, but its association with groceries, dry goods, and other general household material including whiting suggests it was not used for pipemaking. An advertisement of 1 October that year in the same source, noting "For Sale by the Subscriber, Pipe-clay, of an excellent quality, in casks or by the hundred weight" is probably also for doorstep-whitening or some similar purpose - pipemakers would hardly have bought in quantities so small as a cask or a cwt. Pipeclay was used to make whiting and putty, these trades being known sidelines among pipemakers (Atkinson 1966: 273 n.2, 272, 273, 275; Triggs 1970 and C. Green 1973a; Cooksey MS 1). Similarly, the 200 "bls" (lbs? barrels? balls?) of pipeclay sent to Boston by the Bristol pipemaker Joseph Edwards jr in 1805 (see p. 680 below) and the other occasional exports of pipeclay from Bristol during the period 1773-1818 to places such a Tobago and Martinique (R. Price in litt. 18 January 1974) was probably for these purposes, though if indeed Boston received 200 barrels of pipeclay it might possibly have been for a pipemaking industry - so far as this writer is aware, no work has ever been done on any Boston pipemaking industry, though as noted below (p.361) one family of Montreal pipemakers in the second half of last century had come there from Boston (probably, however, from Ireland originally). Pipes supplied to the Montreal fur-traders who operated in rivalry to the Hudson's Bay Company during the period 1760-1821 are sometimes referred to as "Canadian pipes" (P. Miquelon 1971: 98-9) but this must mean pipes for the Canadian market, not pipes made in Canada).

The Great Famine, in the shape of potato blight, first hit Ireland late in 1845, and again in the summers of 1846 and 1847. Death and emigration saw the population of Ireland in the 50 years following 1845 halve. In 1847, in an attempt to ease the problem, free passages to North America were offered to the Irish, and hundreds of thousands of them, all starving and many sick, packed into ships in a manner reminiscent of slave-ships, crossed the Atlantic (over 100,000 are estimated to have died en route). Because typhus had broken out, the United States closed its ports to ships from the stricken areas, and these ships sailed to Montreal, where 6,000 Irish died in the hospital sheds erected for them during 1847-48 (based on Freeman 1957; Woodham Smith 1962; Flinn (ed) 1964: 192-7; and information from Archives Division, City of Montreal).

It is precisely at this time - 1847 - that the first Montreal pipemaker appears, to be followed by a flood of others. Unfortunately, census figures for Montreal are not available earlier than 1851-52, but between then and the census ten years later the population of the city of Montreal (which occupies only a small part of the island of Montreal) rose from 58,000 to 90,000; while that of the rest of the island rose from 20,000 to 28,000. This is almost double the increase for the succeeding ten years - 40,000 compared to 24,000 - and it is almost certain that these figures reflect the large Irish influx. The major area of Irish settlement in Montreal, however, was in Griffintown, near the opposite end of the then built-up area of Montreal from the area where all the pipemakers congregated.

However, there is a difference between the sudden flowering of the Montreal industry and the temporary expansions of the industry in Glasgow and Liverpool, for in the latter two centres Irish names are not prominent among the new makers listed. The reason for this seems most likely to be that Montreal had little if any prior history of pipemaking and that Irish immigrants were forced to make their own pipes. The first pipemaker recorded, a William Henderson, was said to have used a local clay, but at a later date English pipeclay was certainly imported by at least one business, that of Henderson and Lovelace which was the successor of one of the Henderson pipemaking firms (I. Walker 1966d). The pipeclay used by the Quebec City firm of W. and D. Bell was also from England (Anonymous 1870: 71).

A very noticeable feature of the Montreal industry is its concentration within a very small area of the city. Almost all the pipemakers worked in the area at the foot, or riverside - east - end, of what is now de Lorimier Ave (called prior to 1886 Colborne Ave and before ca.1840 known as St Helen St). The area was known as St Mary Ward, though at the turn of last century a change in boundaries made de Lorimier Ave the southern boundary for that ward and created Papineau Ward to cover the area to the south formerly in St Mary Ward.

In the earlier part of last century the area was known as the Quebec Suburbs. It lay north of the C18 city walls and comprised little more than scattered settlement along the road (St Mary St, now Notre Dame St) running north from Montreal along the west shore of the St Lawrence, and was almost on the extreme northerly end of the city limits until these limits were extended in 1883. Maps from the 1830s onwards indicate proposed streets running inland in the suburbs area, but even as late as ca.1870 much of the area back from the river was still open country and de Lorimier Ave, which was developed for only about three blocks back from the river, represented the northern limit of the continuously built-up area of Montreal. A comparison between the Fortifications Survey of Montreal published in 1871 and Hopkins's atlas of Montreal published in 1879 - both produced at a large scale - suggest that it was only in the 1870s and later that the line of de Lorimier Ave beyond St Catherine St began to be built upon. The pipemakers thus worked on the edge of open country at the northern limits of the city.

The area was, however (and still is), a predominantly industrial and working-class area. Molson's Brewery, founded in 1786, lies immediately adjacent to the pipemaking area and expanded to include a distillery plant in 1821; the "new" Montreal Gaol was built in 1831-36 at the foot of de Lorimier Ave directly opposite where a number of pipemakers were to set up business and continued to be used as a jail until 1912 (the buildings are now occupied by the Quebec Liquor Board). Before 1840 a foundry and another distillery were also in business nearby. As the second half of the century progressed a number of industrial concerns moved in - de Lorimier Ave west of the jail, for example, was occupied by a railway workshop, a glass foundry, and a nail and rolling mill by 1890. Throughout the period of pipe manufacture - 1847 to 1907 - there were at least two tobacco factories in the area, one in the premises of the second distillery mentioned above (ca.1905 this became a carriage and harness factory). During this same period the docks expanded north down the river, railways being laid along the riverside to service them in the later 1880s.

Prior to 1842 there appears to have been no development of the de Lorimier Ave area other than the existing line of road and the jail, for in that year a plan was published indicating proposed street and lot layouts for an area ca.350 ft on either side of a ca.100 ft-wide road and extending inland from Notre Dame St ca.1,500 yds. This area (including the jail, the land for which had been bought in 1831) was part of a strip extending well beyond the then western city boundary and inland for over 1-3/4 miles - to about the present line of Boulevard St-Joseph - which had belonged to the heirs of Sir John Johnson who had died in 1830 and the site of whose mansion is now under the Molson complex. It is therefore extremely unlikely that there was any occupation, at least legal occupation, in this area prior to the subdividing of the area in 1842. (At this time the land was owned by two Canadian politicians, J.S. Cartwright and W. Daly.)

As noted above, most of the area inland along the line of de Lorimier Ave was still undeveloped as late as ca.1870, though the proposed layout with its street names did continue to appear on maps after 1842. It thus appears that when the pipemakers started settling in the area less than ten years after than the sub-division had been proposed they were settling a new area, and not in an old industrial quarter or in cheap slum property. However, the evidence, as well as the present-day condition of the area, indicates that it must have been designed as a working-class area (FIG 130).

Unfortunately, numbering changes on the various streets make locating some of the pipemaking premises difficult, and the area with the great concentration, especially at the beginning of the period - the 1850s and 1860s - is the south side of the foot of de Lorimier Ave; the adjacent small streets of Brant Lane, Eire St, and Kent St; and the end of Dorchester St which meets de Lorimier Ave between Erie and Kent Sts, which was almost entirely cleared for the approaches of the Jacques Cartier Bridge built in 1926-30. (Brant Lane, originally called William St and still called William Alley on the 1879 plan though it was known as Brant Lane long before that date, no longer exists; it lay south of Eire St and immediately north of Craig St. Kent St is now called Falardeau St). FIG 131 shows Erie St in 1973 looking south towards Dorion St; the now-cleared area on the west side of the street (rt of photograph and behind photographer) was occupied by a number of pipemakers. FIG 132 shows Dorion St (known last century as Shaw St) looking west from its junction with Lagaucheterie St: the arrowed buildings either held pipemaking premises or are on the site of pipemaking premises (no investigations have been made of the buildings). The nearer arrowed premises (now 1056-60 Dorion St) was 32 Shaw St, occupied 1870 by Dennis Murney who is recorded at a variety of addresses between 1856 and 1878; the farther (now 1094-1098 Dorion St) was 48 Shaw St, occupied 1867 by Richard Gibson, a maker listed for that year only.

(This historical background is based primarily on a study of C19 and C20 maps and plans of the area and on Atherton 1914: II, passim and De Volpi and Winkworth 1963: passim; also on information supplied by the city of Montreal Archives Department.)

One feature obvious from the directory entries is the rapidity with which pipemakers changed their address within this small area, even allowing for an apparent numbering change on de Lorimier Ave. In addition, a number of pipemakers are listed at the same addresses, suggesting communal kilns and workshops were used in the trade. There must in fact have been a veritable pipemaker's ghetto in the area.

In dealing with the Glasgow industry it was noted that the owners of some of the biggest firms appeared able to afford houses in fashionable areas, and there is one example of something similar in Montreal involving one of the Henderson pipemakers. As already noted there were several Henderson pipemakers, and the distribution of Henderson-marked pipes suggests that one or more of these firms had a far more important business than the other Montreal makers. This firm may have been that of James M. Henderson, who was latterly associated in the business with his son of the same name; one of these James M. Hendersons was also associated with an E.M. Lovelace in a firm which imported pipeclay from England. The evidence suggests that initially James M. Henderson lived in premises adjacent to his factory at the foot of Colborne (de Lorimier) Ave, but during the period 1866 to 1872 he is listed as living at 296 Colborne Ave while the factory is at number 114. The latter number was situated on the south side of the street immediately below St Catherine St, a corner which at that time marked the farthest-north expansion of the continuously built-up area of Montreal. Number 296, on the other hand, is called Woodbine

Villa on the 1871 Fortifications Survey, and lay on the south side of the road about one-third of a mile west of St Catherine St. At that date it still lay well away from the nearest built-up areas and was built on the banks of a small stream. By 1879 urban development had spread beyond this area both to the north and west and it was no longer in the country (the site is midway between Lafontaine and Ontario Sts and now covered by a municipal garage), but Hopkins's atlas of this date, which lists the owners of large properties, lists a James M. Henderson here. Further, the adjacent property to the west, number 310, is marked in 1879 as belonging to the Dow estate: this must be the estate of one of the Dow brewing family, which reinforces the suggestion that the area prior to urban development had been favoured by the well-to-do. (Buildings appear on the Henderson and Dow properties on the 1847 map which showed the projected subdivision of the area, confirming that these properties dated from well before the development of the area.)

As noted when discussing the Glasgow and Edinburgh industries, it seems likely that rapid changes of premises, including firms taking over properties of other firms which then move to other premises, suggests an unstable industry with many speculative ventures. As with the Glasgow industry, there are several firms which last a considerable time (relatively speaking, in an industry lasting only 60 years) and are thus presumably the most stable; but there are many names which appear for only a very few years, and many address changes, suggesting that competition was fierce and failures frequent. As might be expected, therefore, from an industry that rises and declines as rapidly as does Montreal's, there is every suggestion of great instability.

Further, to judge by the frequency with which Glasgow pipes occur on New World C19 sites, Glasgow was able to command a much wider market than Montreal, and this may have contributed to the instability of the Montreal industry. The brier pipe and the cigarette (the American cigarette industry becoming mechanized in 1880) must have contributed to the decline of the Montreal industry; the Glasgow industry, though in terms of number of makers at its zenith ca.1880, must have been losing its export market about the same time the Montreal industry was declining, for as noted when discussing the Glasgow industry few Glasgow pipes datable to post-1891 on the basis of their being marked SCOTLAND instead of GLASGOW have been found on North American archaeological sites.

Unfortunately, there appears to be little evidence available to indicate the size of Montreal firms. In 1856 Neil Doherty's firm, which had been established six years previously, employed 20 to 25 people and manufactured yearly "from 4500 to 5000 boxes, which are all consumed in the Canadas [i.e. Upper and Lower Canada, the provinces of Ontario and Quebec]" (Anonymous 1856c: 137, 1952 ed). The firm of Henderson and Son, one of the Hendersons mentioned above, is recorded by the same source as being founded in 1851, and in 1856 employed 100 hands and produced annually 15,000 boxes with means of extending the quantity to 25,000. The source calls the products in quotes "Henderson's Tobacco Pipes" as though this was their title (ibid.: 138) - this may possibly be the reason for some pipes which have been found with HENDERSON'S on the stem, as opposed to those with simply HENDERSON, which were presumably made by one more of the other makers with this name.

Unfortunately, no idea is given of the size of a box of pipes, or the number of pipes it would hold, but the fact that Henderson and Son employed 100 people indicates they were a relatively major concern. As the source referring to Doherty and Henderson and Son mentions no other pipemakers, although other sources indicate at least ten others by 1855, it seems likely that Doherty and Henderson and Son were the largest firms at this time. This in turn would suggest that the other pipemakers known at this time ran very small businesses with perhaps fewer than a dozen employees - they may even have been purely family businesses with ony three or four workers altogether. The firm of W.H. Dixon and Co, which took over the business of a William Henderson in 1867 and was also known as the Canada Pipe Works, was winning prizes at exhibitions in the 1870s, suggesting it was of some reputation; an advertisement of 1888 noted the firm as making "D.T. [sic - T.D.] and fancy pipes" and supplying English pipeclay (Collard 1967: 337). It closed in 1894.

It is not clear how widespread Montreal-made pipes were traded. They occur in eastern Canada and Ontario (e.g. Barka 1965: 443; Gall 1967: 51-2 but with wrong dating; Dawson 1969: 45-6; 1970: 48; I. Walker 1971d: 25 and 30) but even at Fort Lennox, only ca.30 miles south of Montreal, while Montreal-marked fragments were the ones most commonly found during the 1965 excavations (Lemieux 1965), only two Montreal firms are represented by name and only one of these occurs frequently. Indeed, this name - Henderson - occurs far more often than all the others put together, though this may be partly because there is more than one firm with this name. There were 88 marked HENDERSON and 5 marked HENDERSON'S, and 4 marked R. BANNERMAN. Pipes by another Quebec maker, Bell of Quebec City, were recorded 4 times. Glasgow is represented by White and A. Coghill (11 fragments each), McDougall (7 fragments), Yuile - whose name does not appear in any Glasgow directory as a pipemaker - once, and an unidentified DMG/SCOTLAND once (this last should probably read DMD or DM^{C}D - a post-1888 catalogue of McDougall's notes the firm's trade-mark was D·M·D inside a diamond and also illustrates a pipe with DM^{C}D on the stem. A TD pipe with DMD on one side of the stem and SCOTLAND on the other comes from a dump near Dundas and another from a dump at St Catharines, both in southern Ontario (T. Kenyon *in litt.* 15 June and 18 July 1972)). (Gambier of Paris is also recorded once). At Fort Wellington, near Prescott, Ontario, ca.110 miles SW of Montreal up the St Lawrence, Henderson pipes - 17 examples - again made up more than half the total of pipes found with makers' names in the 1968 excavations (Wylie 1971: 78): Bannerman, Dixon, and Bell were represented by one example each while Glasgow-made material was represented by Coghill (six fragments), White and Murray (three fragments each), and Davidson (one fragment). At Fort Coteau-du-Lac, however, which is just inside the Quebec border and only ca.45 miles SW of Montreal up the St Lawrence, excavations of a mainly C19 fort produced rather more known Scottish-made pipes - 189 - than Montreal-made - 168. Here pipes marked DIXON (1) and DIXON'S (2) occurred in addition to those marked HENDERSON (93) and HENDERSON'S (53) as well as 2 marked R. BANNERMAN and 17 simply marked BANNERMAN. There were also 9 Bell of Quebec City fragments. (In addition, there were three English makers represented by 27 fragments, one example of Prince of Gouda, and one of

Fiolet of Saint-Omer (ex info. Miss E.A. Wylie).)

Even if it were not the habit of all Montreal makers to put their names on their products - and one would have thought in such a fiercely-competitive industry such advertising would have been important - the presence of sizeable quantities of Glasgow pipes at sites relatively close to Montreal suggests local pipemakers had only limited success in combating Glasgow makers, though of course as the Montreal industry dates only from the mid-C19, sites with occupation from before that period would have a biased proportion of non-Montreal material. However, with the exception of one Doherty stem from the Grande-Chute site in Quebec province (D.S. Robertson in litt. 4 July 1971) and at least two from the Montgomery Lake site Number 4 in Ontario (B.M. Mitchell in litt. 2 August 1969; D.S. Robertson in litt. 14 January 1975), both sites in the upper Ottawa valley; and three Murphy stems - one from Fort Wellington, Ontario, and two from Lower Fort Garry, Manitoba (in collections of the Research Section of the National Historic Parks and Sites Branch in Ottawa), all of buff clay, one of the latter with a bowl and possibly reading R. Murphy - this writer has so far neither seen nor heard of any of the names of other makers known to have been working in Montreal occuring on pipes. (Neil Doherty is recorded 1850-57; a Richard Murphy is listed in 1864, a Thomas and a Mathew in 1871.) When one considers that a Glasgow-made pipe at least latterly cost at a minimum twice as much when sold in Montreal as in Glasgow because of added costs of freight, duties, and allowance for broken goods (Rodger in litt. 17 January 1972) it does seem surprising that Glasgow pipes should have outsold native North American-made pipes: granted North American makers would have had to import pipeclay from England, but bulk carriage of this would have been cheaper than for pipes, duties would have been lower, and there would have been no breakage.

Outside eastern Canada and Ontario, pipes made by one or other of the Hendersons have been found at Lower Fort Garry, near Winnipeg, Manitoba (ex info. writer's wife); and in the United States from a site in Maine (Fox 1972: 33); on various sites in Michigan (Herrick 1958: 5; Gibson et al. 1960: 47; Fitting 1965: 68, pl xxxix; Brose 1967: 64; Crumley 1973: 269); in Ohio (Omwake and Becker 1965: 137-9, 149; Angeloni in litt. September 1971); in Minnesota (Hagerty in litt. 12 December 1967); and, much farther away, three sites in Wyoming (R.L. Wilson 1961: 130-2, pl V,3-4; 1971: 30, 67 fig 16,A; 44, 76 fig 31,1). This tends to support the view that the Henderson makers were the most important in Montreal. Outside Quebec, Bannerman and Dixon pipes have been found at Lower Fort Garry (ex info. writer's wife), while Bannerman pipes have also occurred at a site in Maine (Fox 1972: 33); Dixon pipes at Portland Point, New Brunswick (Barka 1965: 443) and Fort Walsh, Saskatchewan (material in collections of Research Division, National Historic Parks and Sites Branch, Ottawa); and a red clay stem-fragment marked D. FORD/MONTREAL, a maker who is recorded 1857-73, has been recovered from the Pigeon River at Fort Charlotte, extreme NE Minnesota, on the United States-Canada border at the western end of the Grand Portage trail (Birk in litt. 26 January 1973; 1975: 83), all of which finds indicate that widespread distribution of Montreal-made pipes was not confined solely to the Hendersons' products.[12] However, it is only fair to point out that excavations of C19 sites in North America are only beginning, and future discoveries may profoundly modify present knowledge (a Bell of Quebec City stem was recovered at the same site in Maine - Indian Island, at Old Town, near Bangor - as the Henderson and Bannerman stems noted above (Fox 1972: 33)).

One interesting feature connected with the Montreal pipe industry and at present being investigated is the apparent founding of the Detroit clay pipe industry by immigrants from Montreal. Virtually all the Detroit makers' names are those already recorded in Montreal, and confirmation of a Montreal origin comes from the 83-year old daughter and niece of two Detroit makers who is still (1969) alive and who records her parents came from Montreal, the mother (wife of Michael O'Dwyer) being a pipe trimmer. The uncle, John, may be the John Dwyer [sic] noted in Montreal from 1872 to 1874. The two O'Dwyer brothers worked in Detroit from 1880 until 1903 when John died and the business closed. In 1881, and apparently for that year only, O'Dwyer and Hamlyn Co is listed - the Hamlyns were another Montreal family of pipemakers, one being recorded in Montreal from 1873-77 and appearing in Detroit in 1878 - and pipes marked ODWYER & HAMLYN/DETROIT, ODWYER BROS/DETROIT, or simply ODWYER BROS without the place of origin (cf Brose 1967: 64) are known. As the ODWYER BROS example recorded by Brose without the "Detroit" comes from a layer datable to 1893-95 it is tempting to suggest that the "Detroit" had been taken off, or allowed to wear off, the moulds after 1891 when imported items had to bear their country of origin and native American industries were thus to some extent protected and felt less need to advertise where they were made. Certainly, one ODWYER BROS fragment with "Detroit" missing has a blank flattened area as if the place-name had been removed. Miss O'Dwyer also records her parents came to Montreal from Boston - it seems likely they arrived there from Ireland as a result of the potato famine.

The first Detroit pipemakers appear in 1878, just as the Montreal industry is beginning to decline; this decline, and the considerable instability noted in the Montreal industry, doubtless caused the migration of some makers to Detroit. The industry continued there until 1901, when the last firm, Deffley's - a family noted in Montreal from 1856 to 1875 - is recorded for the last time. As in the case of Montreal, there is evidence of instability in the Detroit industry; and as in Montreal and other pipemaking centres noted, the Detroit pipemakers congregated in one extremely small area of the city (the Detroit information is based on E.M. Green 1969).

To sum up therefore, the Montreal pipe industry was confined to virtually the second half of the C19, rising rapidly in size from a single maker first recorded in 1847 to 18 makers in 1875 and declining as rapidly to the disappearance of the last maker in 1908. The industry concentrated in a working-class suburb of eastern Montreal; it had a large Irish element among its manufacturers and may have had much of its trade among Irish immigrants arriving during and after the Potato Famine in Ireland. Its largest firms traded over Quebec and Ontario and as far afield as New Brunswick, Maine, Michigan, Manitoba, Saskatchewan, and even Wyoming, but despite its obvious theoretical advantages the Montreal industry was never able to prevent the Glasgow industry from dominating the North American market. When the Montreal industry began to decline in the later 1870s, several pipemakers moved to Detroit and worked there until 1909, when the last firm closed. There as in Montreal, the makers worked in one small part of the city.

SECTION VI:
EAST LONDON

East London - the initial letter of "east" is traditionally spelt with a capital - is a cultural rather than a strictly geographical area (cf Pollins 1961: 15-16) and has no political definition. Tongue (1971: 102), describing the new London boroughs of Hackney, Newham, and Tower Hamlets, puts it rather well: "[they] comprise that amorphous, sometimes apparently shifting mass which is instinctively recognizable to East Londoners as East London but which has no clearly defined boundaries, neither ethnological, nor geographical, not yet administrative." As defined by Sinclair (1950: 32-3) it covers 72 square miles and comprised - before the reorganization of London boroughs in 1965 and the expansion of the county of London to include all Middlesex and parts of Essex and other counties - 13 boroughs in the counties of London and Essex. The term here, however, is generally used in an older and more restricted sense to describe what the Post Office calls London E.1 and E.2 and what used to be the boroughs of Stepney and Bethnal Green before they and the borough of Poplar became the borough of Tower Hamlets in 1965 (for a history of the name Tower Hamlets see Power 1965). This area includes the hamlets (as they formerly were) of Wapping, Shadwell, Ratcliff, Limehouse, St Botolph without Aldgate, Whitechapel, Shoreditch, and Bethnal Green, all then in East Middlesex and most of them part of or formerly part of the once-vast parish of Stepney (George 1925: 406-7, 1966 ed, Barnes 1967: 13-18). The first four named lay along the north bank of the Thames from the Tower to the Isle of Dogs; the remainder lay east, NE, and north of Aldgate, the main eastern gateway to the City of London.

In the earlier C17 there is a very large number of pipemakers recorded in the parish registers covering these hamlets: 36 in the first half of the century, 26 of these from the four riverside hamlets and 19 from Ratcliff alone (Oswald in litt. 9 January 1968, cf a figure of 48 for the period to 1650 over a larger area of East London in Oswald 1970b: 229). At the beginning of the C17 the riverside hamlets had by far the larger part of Stepney's population, Ratcliff being the most populous of all. Predictably, the vast majority of the riverside population were connected directly or indirectly with shipping (East London History Group 1968). In the second half of the century only 12 pipemakers are noted from the same sources, of whom 8 came from the riverside hamlets; but other evidence noted below suggests this is an under-estimation. However, the Finsbury plague lists from 1653 to 1667, checked against the St Giles without Cripplegate registers, give 69 makers, presumably all outside the walls and on the City's NW boundary (Oswald in litt. 9 January 1968), suggesting a concentration there. This finds some confirmation in the London pipemakers' guild apprenticeship indentures for the period 1689-1734 - all that survive - where the general area of work of the freeman involved is noted in 40% of the indentures. Half of these freemen worked outside the City, and the half inside the City worked on the boundaries, with the greatest concentration in the Cripplegate area. Other concentrations were in Westminster - to the west of the City - and Aldgate and Whitechapel to the east, all slum areas (Atkinson and Oswald 1969: 174; Oswald 1970b: 229).

The 1695 list of inhabitants of the City is extant for 80 of the 97 parishes within the walls (Glass (ed) 1966) but unfortunately occupations are listed in only a few instances. However, in the presumably random cross-section of trades which are noted, pipemaking does not appear - nor does potting - and certainly in 1806 a lease of a property in Cheapside specifically forbade pipemaking and other offensive trades (Atkinson and Oswald 1969: 174). Among these offensive trades were those of founder, slaughterman, brewer, and tallow-chandler; but if indeed there was earlier a specific ban on certain trades including pipemaking - perhaps one on kilns in built-up areas because of fire-hazard - it does not appear to have included such trades as smithing, to judge by those recorded in the 1695 census. Further, any concern at that time about keeping out disagreeable trades does not appear to have spread to such noisome examples as skinning - a number of skinners are recorded in the census. The strictures of the 1806 lease do not appear to have been unique nor confined to London, however: a deed of 1822 for a property in Macclesfield in Cheshire prohibits the "trade of bleaching...and pipe making or any other offensive trade" (quoted in G.C. Spence 1942: 57); and an 1858 comment on the smells in one slum area of Camberwell in South London included the smell of hearthstones - blocks of whiting used on hearths, doorsteps, etc and often made by pipemakers (see p.555 below, p.341 and n.3) - in the prevailing melange of haddocks, oranges, mortar, soot, winkles, rotten rags, and herrings (noted in Dyos 1961: 111).

The eastern and nortern suburbs and Southwark appear to have housed much of London's general industry by the beginning of the C17 just because these areas were beyond City control (Unwin 1904: 218-9, 1957 ed; 1908: 266-9; 1963 ed; George 1925: 18-19, 1966 ed; Reddaway 1940: 34-5, 42, cf 82-4, 306-8, 1951 ed; Dyos 1954: 59 and 61 and 1961: 34-6 and refs) - as noted below, East London started to a considerable extent as an industrial area - but in the second half of the C17 industries such as lime-burning and dyemaking were still continuing in the City (Pearl 1961: 15-16). When one considers that as early as 1285 and 1307 there had been a whole series of complaints about and prohibitions against lime-burners and smiths in Southwark, Wapping, and East Smithfield using coal so that an "intolerable smell diffuses itself...to the annoyance of the magnates, citizens and others there dwelling and to the injury of their bodily health" (R. Smith 1961: 3; cf Nef 1932: I, 157) it is clear that restrictions on industry were never very effective, and one wonders whether a prohibition on pipemaking could really have been so effective as to remove pipemakers from the City.

While East London is made up of many areas each with their own economic and historical background, the area has certain features in common. The City, in medieval times and later, applied a rigid closed-shop policy on craftsmen through its guilds, and Richard III placed restrictions on foreigners in the City, forbidding them to keep apprentices or other workers: these two points appear to have been the major catalysts in the settlement of East London (cf Unwin 190-8: 243-7; 1963 ed). Much of the open land surrounding the City was owned by abbeys and priories; these lands were thus liberties, where neither city aldermen nor county sheriffs had jurisdiction, and they continued as such after the Reformation (H.G. Owen 1965: 81-2). The kernel of East London in fact was the liberty of St Katharine's by the Tower where the aliens discouraged by Richard III settled.

The C15 and C16 saw England transformed from a nonentity of a country to a major trading and commercial power. The reigns of Henry VII and Henry VIII saw not only the beginning of English trade and seapower (at the beginning of the C15 English maritime trade had been largely in the hands of foreigners: the Hansa slowly lost its powers in England only during the C16) but the arrival of skilled artisans from abroad. Tudor gunners, for example, were nearly all German or Dutch - there was a gunfoundry in Houndsditch, and another in East Smithfield. The growing opulence of the extravagant Henry VIII and his desire to enter the sophistication of the Continent resulted in French clockmakers, French silkweavers, French chefs, and many foreigners in the felt hat and above all the leather trade arriving in London. Shipping arriving in the Pool below the Tower brought Scots, Flemings, Frenchmen and others. Inevitably there was an outbreak of xenophobia, in which London apprentices took a leading part. As a result, 12 apprentices were hanged and quartered, and the laws against aliens having apprentices tightened. Aliens in trades in the City and for two miles outside were to be controlled by the guilds, but this proved difficult to enforce, for by this time there were 6,000 or 7,000 foreigners in and around London, and it had little effect on the expansion of industries introduced by skilled foreigners.

The initial movement of aliens to the east of the City, the proximity of the Pool, the presence of the Tower where there was a demand for skilled labour, the presence of the City itself as a market for goods, all set off a cycle of ever-increasing settlement by subsequent foreigners who tended to come to an area where others of their language and trade already were. The list of nationalities and trades could be vastly extended; the liberty of St Katharine's housed the foreign glassmakers and goldsmiths, rivals of the respective City guilds, though apparently not always in strife (Unwin 1908: 246, 1963 ed). By 1540 one-third of the London population was foreign, and some areas were virtually wholly populated by foreigners. As the religious storm broke in Europe large numbers of French and Low Countries refugees came to England, many settling in East London.

By the end of the C16, the time when the pipemaking industry was beginning, therefore, a predominantly cosmopolitan and industrial atmosphere existed: in 1592 a writer spoke of the rogues and vagabonds who found refuge in the suburbs and liberties - the unemployed and unemployables who always gravitated to such areas - and Shakespeare refers to the local toughs of the eastern suburbs. It is not coincidence that Burbage's first theatre, with all the low associations such establishments had, should be in tolerant East London, away from the hostile City Fathers but near enough the City for patrons. The split between East and West London which still exists has been a feature of London development since the second half of the C16 (George 1925: 75, 1966 ed).

To this must be added a third factor: the growth of English seapower. Ratcliff had been a port from at least the middle of the C15, and in the Elizabethan period it became one of the chief centres for maritime exploration. Ratcliff Cross - a wayside cross which became a sailors's landmark - is noted by Hakluyt, and shipwrights began to build themselves large houses there. In 1553 Willoughby and Chancellor set sail from Ratcliff to search for the North-East Passage, and though Willoughby and part of the expedition perished, Chancellor reached Moscow via Archangel and as a result the Muscovy Company was set up. Other expeditions attempting to find the North-East Passage sailed from Ratcliff in the years following. So did Frobisher in search of the North-West Passage. William Burrough, Comptroller of the Navy and second in command to Drake late in Elizabeth's reign, lived in Stepney near his ships; Sir Humphrey Gilbert lived in the "pure air of Limehouse" (as a writer in 1605 described it - quoted in Pevsner 1952: 410 and Pearl 1961: 12 n.9) and his half-brother Ralegh lived at Poplar and later at Mile End. A native of Ratcliff and another of Aldgate sailed the first English and Dutch ships to Japan. Hudson used St Katharine's Dock (not the present one) as a departure point for his expeditions. In 1614 the East India Company built a dock at Blackwall (Ratcliff and Blackwall were the harbours of Stepney).

A feature of London from the later C16 onwards was its rapid expansion both in area and population (see for example Maps of Old London 1908 and Trevelyan 1942: maps pp587-97, 1946 ed) despite repeated attempts by the City to prevent this (Reddaway 1940: passim e.g. pp34-5, 1951 ed). By 1695 London is estimated to have had a population of ca.500,000 while Norwich and Bristol, the two largest cities after London, had populations of ca.29,000 and ca.25,000 respectively (P. Deane 1965: 14). The built-up area was expanding to link the City with Wapping, Shadwell, and Limehouse. With the removal of Execution Dock farther downriver, "a continuall streete, or filthy straight passage, with Alleyes of small tenements or cottages builded, inhabited by saylors victualers, along by the riuer of Thames, almost to Radcliff,..." had appeared by 1598, where 40 years previously the area had been open country (Stow 1908 ed: II, 70-1). Many small tenements had also recently been built along the highway from the City to Ratcliff, replacing the elms formerly there; while Ratcliff itself was expanding east to Limehouse, the "faire hedges, long rowes of Elme, and other trees" lining both sides of the highway having been similarly replaced by buildings (Stow 1908 ed: II, 71 and 261 n.). Before the second half of the C17, slums had already appeared in Stepney, Wapping, Poplar, and Ratcliff (cf Trevelyan 1942: 289, 1946 ed) and the plagues of 1625 and 1665 took their greatest tolls in Stepney parish. Yet paradoxically, in 1666 the Great Fire was to force 80,000 people from London into the suburbs; and of the 20,000 who did not return, prefering to remain in the suburbs and set up business, many settled in East London, beyond effective City control but still near enough for markets (Reddaway 1940: 300-8, 1951 ed; Mitchell and Leys 1958: 178, 1963 ed; Priestly 1966: 225, 232; Barnes 1967: 17-18). One cause of slum property was that copyholders in the manors of Stepney and Hackney were discouraged, by the customs of these manors, to make leases for more than 31 years, a factor which did not encourage permanent building (George 1925: 75, 1966 ed and Pearl 1961: 12 n.9).

As early as 1627 there had been an attempt to bring liberties, outlying parishes, and the City together with some sort of overall control with the Bills of Mortality which parishes in the City and surrounding area had to return. The number of parishes which had to make these returns was increased, Whitechapel being added in 1629 and a great extent of East London - Hackney, Islington, Newington, and Stepney - being added in 1636. In 1613 the Privy Council proposed to group the suburbs into districts, but the City, though worried about the number of artisans settling in the suburbs, strenuously objected to a proposal to incorporate the suburbs, fearing rivalry. Nevertheless, Charles I did proceed with incorporation, and by 1637 the corporation was functioning, and regulations for trade apprenticeships and freedoms were in being. However, the suburban craftsmen did not take up their freedom when called to do so - perhaps not surprisingly, if many had indeed moved or been forced to move from the City because of Guild restrictions - and the City still remained hostile to the scheme, so that with the advent of the Civil Wars the whole idea ended. Similar proposals after the Restoration met with the same opposition from the City, so that East London was able to continue its largely independent course (Reddaway 1940: 44, 1951 ed; Priestley 1966: 47-9).

Thus East London, then as now, was a crowded, bustling, cosmopolitan, independently-minded area, particularly suited to small businesses, and exhibiting a feature very noticeable last century and indeed to a considerable extent today - the close juxtaposition of wealth (if not sophistication) and dire poverty.

East London, especially Stepney and the Minories, early acquired a reputation for nonconformity: even in Mary I's reign, 1553-58, when Protestants were being burnt, Stepney appears to have been a refuge. From 1559 for much of the C16 the Minories were the centre for radical nonconformity, and certainly by 1579 nonconformity was firmly established in Stepney (H.G. Owen 1965; Hill and Frere (eds) 1891: vii). After 1640, and indeed into the time of the Industrial Revolution, much of the area - indeed, most of the eastern suburbs on both sides of the river - had a reputation for radicalism and nonconformity (Pearl 1961: 38-42; cf Bezodis et al. 1957: 3; E.P. Thompson 1963: 23, 1968 ed), and several prominent Parliamentary Puritans lived in these areas. The first English Baptist Church was opened in 1633 in Wapping; in 1644 there was a meeting-house of Independents in Stepney (Hill and Frere (eds) 1891: xvi; Pevsner 1952: 411). In 1684 the justices described the inhabitants of the Tower Hamlets as "generally very factious and poore", the factiousness referring to their having "sixteen large public conventicles as big as most churches" and in continuing to hold private meetings when the conventicles had been suppressed (quoted in George 1925: 76 and 332 n.8, 1965 ed). East London was a place where "the social and racial composition...made it very difficult to attract Anglican congregations" (Bezodis et al. 1957: 9 cf Inglis 1963: 49) - this comment was made specifically about the Jewish influx to C19 Spitalfields and Mile End New Town, but it is true for a wider period and area. How difficult can be seen by the closure between 1911 and 1920 of four Anglican churches built between 1839 and 1875 in Spitalfields and Mile End New Town (Bezodis et al. 1957: 8-9; Barnes 1967: passim).

The apparent lack of pipemakers in the City suggests that this craft was actively discouraged there, for whatever reason, so it seems probable that their concentration in East London and other suburbs is a result of this hostility. It is tempting to suggest that the very marked concentration of pipemakers in Ratcliff was due to the number of sailors in its port and perhaps to Raleigh's having lived nearby. The drop in Ratcliff makers in the second half of the C17, if indeed a reality, may have been due to the general overall increase in pipe manufacture which caused makers to move to other markets and at the same time extend markets so that they did not need to huddle together. It is unlikely that Ratcliff ceased to be so important as a port in view of the expansion of shipbuilding which marked Pepys's period at the Admirality in the second half of the C17 and the building of the first two wet docks on the Thames, one at Blackwall and the other at Rotherhithe (the Howland Dock), but perhaps there was an evening up of prosperity throughout the Thames-side shipping points.

The economic background to the C19 East London pipemaking industry is rather different from that of the C17 industry, but in at least two aspects, the influence of the port of London and the cosmopolitan tradition of the area, there is a common thread. A writer ca.1780, observing that a large part of the inhabitants of the East London riverside included "sailors and other workmen, who are employed in the construction of ships" was only reiterating the comments of the justices of the Tower Hamlets a century earlier, when they noted in 1684 that a major part of the inhabitants there included "seamen and such who relate to shipping" (both quotations in George 1925: 76, 1965 ed).

In the C18 the metropolitan population of London rose from 600,000 to 900,000 and the foreign trade of the port quadrupled: 1,775 vessels could, it was asserted, be seen on the river between Blackwall and London Bridge, and some 3,500 lighters and similar small craft were engaged in taking the goods from the ships to the shore. There porters picked up the goods in small amounts and took to warehouses and other premises all over London. Meanwhile the East India Company left its Lascar seamen to beg in Wapping, Shadwell, and Poplar for months at a time, between voyages (George 1925: 143-5, 1966 ed).

Robbery by everyone from customs officials and shipmasters to lightermen and porters, and mudlarks who collected material thrown overboard from ships at night, lost London merchants £506,000 a year it was alleged in 1800 (quoted in Ashton 1955: 72, 1961 ed; cf Howgego 1967: 76). It was this figure which persuaded the West India merchants, backed by the City Corporation, to build the West India Docks at Poplar with wharves and warehouses walled to prevent theft.

The East London of Mayhew and Booth and of Dickens and Jack the Ripper may be said to stem directly from this venture and those that followed, and from the impact on the area of what is loosely called the industrial revolution. The laying of the foundation stone of the West India Docks in 1800 laid the foundation of events which could never have been dreamt of at the time. The West India Docks opened in 1802; three years later the London Docks opened, to be followed the next year by the East India Docks. The second-named's construction disembowelled much of Wapping and Shadwell (cf Dyos 1957: 29 n.2); the Shadwell brothels and lodging-houses moved to Limehouse. Following these docks came the Surrey Commercial on the site of the Howland Dock on the south side of the river. Private companies hurriedly built their own docks, including the Regent's Canal Docks and the St Katharine Docks. The later, uselessly small and constructed in 1825-28 during a fit of inter-company rivalry, was built by destroying warehouses, sheds, and 800 houses, and turning 11,300 people into the streets (Sinclair 1950: 245; P. Carter 1969: 52; Howgego 1967: 92-5; Renton 1969: 25 - there are slight differences among these accounts and Carter thinks this mammoth displacement of people was "probably a blessing in disguise.") At the festivities to mark the opening of the dock, bands played The Roast Beef of Old England to signal that food was being served (Howgego 1967: 93 and 95); it is not recorded that the 11,300 homeless were invited). The broad Commercial Rd, with its extensions the East and West India Dock Rds, was laid out in 1803 and built in the following seven years, the eastern and western ends cutting through already built-up areas.

There was then a lull in dock-building for some 20 years, while railway-building from the 1830s and for much of the century occupied speculators, carving ruthlessly through large areas of poorer London (cf Dyos 1955a; 1955b; 1957; Mitchell and Leys 1958; 286-7, 1963 ed) and setting up ripples of migration ultimately extending as far as Tottenham and Walthamstow.

The docks attracted labour to an area already beginning to be crowded by the late C18; their construction put tens of thousands of those already living in the area out of a home. On top of this, the tradition of the area as a refuge for foreigners was responsible for adding hundreds of thousands to the population. In 1709 Germans fleeing religious persecution in the Palatinate had settled in East London: in the 1830s St George's-in-the-East was still known as "Little Germany" (Keeling 1970: 127). An observer writing ca.1780 noted that "the east end, especially along the shores of the Thames [was] inhabited...by a great part of the Jews" (quoted in George 1925: 76, 1965 ed). Throughout the C19, waves of European immigrants reached East London - in the 1830s Poles, fleeing an unsuccessful rebellion against the Russians; in the 1840s to 1870s Irish fleeing famine in their native country; in the 1880s, 1890s, and the first decade of the C20 Polish, Russian, and Rumanian Jews (Leslie 1963: 73-7; Leech 1967: 10) fleeing persecution. The 1881 census recorded 16,000 persons in Stepney born abroad; by 1901 the figure was 54,000 (Keeling 1970: 127).

From the middle of the C19 the modestly-prosperous independent shopkeepers and tradespeople - "the solid core of Dissent" (Inglis 1963: 119) - moved to less squalid areas (cf Dyos 1955b: 91), and with their a departure the nonconformist churches lost the backbone of their support (Sinclair 1950: 77), both nonconformity and Anglicanism being replaced by the influx of Jews (Bezodis et al. 1957: 8-9). In the earlier C18, when St George's-in-the-East, Stepney, was built, its parish was inhabited by shipowners and shipmasters, and was a respectable suburb (Barnes 1967: 62). In 1898 a Wesleyan minister, noting that when he began work in London in 1855 "shipowners, manufacturers and merchants" had already left their chapels in St George's-in-the-East and that later the shopkeepers followed them, believed Methodism had been injured more by these movements than by even the chronic schisms which beset the Methodist church in the first half of the century (quoted in Inglis 1963: 63, cf 92-3); and other evidence (Inglis 1963: 62-4) indicates this movement was confined neither to London or to any one religious group. In 1740, when Bethnal Green was separated from Stepney to become a separate parish with its own church, one of the reasons given was that there were 15,000 people living in 1,500 houses and the lack of a church caused "a Dissoluteness of Morals and Disregard of Religion, too apparent in the younger and meaner sort, so much so that people of the Better Sort had removed from their Habitations to the Great Impovrishment thereof" (quoted in Barnes 1967: 25).

However, this migration in East London appears to have been especially a phenomenon of the second half of the C19, on the evidence of a Congregational minister who remembered when earlier in the century the rich had lived in the same neighbourhoods as the poor and had exerted an influence in these areas (quoted in Inglis 1963: 63; cf Methodist examples *op. cit.* 63-4, 11 n.1). Olsen, noting that in the C18 "one could speak of fashionable or unfashionable streets, but not fashionable or unfashionable neighborhoods" and that even in new districts in the C18 the wealthy would occupy "the squares and the principal streets, the middle classes the adjacent smaller streets, and the poor the back courts and mews" suggests the development of the omnibus after 1830 was a considerable factor in allowing areas to be planned without stables and mewses (Olsen 1974: 267-8). In Edinburgh the rich and poor had lived in similar juxtapositon until the former began moving to the New Town and George Sq from the 1760s onwards (Youngson 1966: chapt VIII p.236 and *passim*). Latimer (1887: 3), talking of Bristol, makes the interesting suggestion that it was the prevalence of crime which delayed the complete split between the upper and lower classes until the later C19: at the beginning of the C19 he notes most merchants lived near their warehouses just as the trader lived above his store, in order to be near their premises, and this resulted in rich and poor living in the same streets with the worst effects of class separation avoided. Certainly, when the first H.O. Wills shortly after his marriage in 1791 went into a partnership with Peter Lilly the business moved to the later's works at 111-12 Redcliff St and the Willses lived there until 1808 when they moved to Redcliff Hill immediately adjacent, and it was not until 1815 that the family moved to then-fashionable Portland Square (Alford 1973: 16, 32, 46). Pipemaker William Nicholas was noted in Sketchley's *Bristol Directory*... for 1775 as being at 29 Lewin's Mead, with his "warehouse" at number 17: at this time Lewin's Mead was a respectable area (6: VI), but the principle of having one's business near one's domicile was apparently still socially acceptable at this time and probably so for security reasons. A similar Bristol example is that of Martha and William Okely who successively worked at Under the Bank (now the west side of Colston Ave) 1806-21 and were living on Host St running immediately behind Under the Bank certainly for the period 1812-20. In the City of London a firm of linen factors occupied from 1716 a large house in which the ground floor was warehouses, the next floor offices, and the top the living quarters of the owner and his family; and the owners continued to stay there until the 1830s (Mitchell and Leys 1958: 285, 1963 ed).

On a basis of erecting one Anglican church for every 4,750 souls out of a population of 342,000 in and around London and Westminster who were unprovided with a church it was estimated in 1711 that 72 churches would be required, a number reduced to 50 when it was estimated that 101,500 of the people were Huguenots or nonconformists though increased in 1715 to 54. Five of the 50 churches were to be in Stepney, two in Whitechapel, and one in Shadwell; one of the extra four was to be in Wapping. (Only 10 of the 54 were built - Christ Church, Spitalfields; St Anne's, Limehouse; and St George's-in-the-East, Cannon Street Road, are three - though six other already-existing churches or chapels were rebuilt, repaired, or otherwise altered (Trevelyan 1942: 332, 1946 ed; Bezodis _et al._ 1957: 4, 148; Barnes 1967: 18-22).)

Decline of local industries added to East London problems. The Huguenots who had arrived from France in the 1680s and set up as silk-weavers and -merchants in Spitalfields - where there had been silk-weavers since 1532 (Lonsdale 1962: 92) - had seen their greatest prosperity in the first half of the C18 (cf E.P. Thompson 1963: 157, 1968 ed), when the merchants' houses in Fournier St, for example, had been built. The area had had poverty and industrial unrest from before the 1680s, and its silk industry suffered from trade fluctuations to an extreme degree (George 1925: 178-96, 1966 ed) - those who prospered tended to leave; those who did not, stayed (Bezodis _et al._ 1957: general introduction, _passim_). The dislocation of trade caused by the American Revolution hit the silk trade - in 1777 Wesley noted extreme poverty in Bethnal Green (which had been largely built by the silk-weavers) - and because of the importance of the industry the government gave it protection from foreign silks. At this time whole streets in Bethnal Green and Mile End New Town - the latter an area with a more English population of weavers - were given over to silk-weaving, but standards were falling and middlemen were coming between weavers - traditionally independent - and buyers and the former were forced into poorer conditions. By 1780 the separate identity of the French community was rapidly disappearing, and by 1840, while Bethnal Green still had nearly 8,000 looms, Spitalfields and Mile End New Town had under 1,400 between them (Bezodis _et al._ 1957: 8; cf Leech 1964: 58-9 and Schwartz 1973: 96). Finally, a commercial treaty with France in 1860 abolished the protections noted above, signalling the end of the small craftsman. Hand-loom weavers survived in ever-decreasing numbers until 1939 - the story that Pius IX, needing a seamless silk robe to symbolize his papal infallibility, had to have it woven by a Huguenot in Spitalfields, is well known; and one of the last weavers wove the cloth for Edward VII's coronation robe - and the last Huguenot silk firm did not close until 1955 (Young and Willmott 1957: 90, 1962 ed); but the industry in East London had died, and its craftsmen ended their lives in poverty, or went in the spread farther east, or to Lancashire, or to the United States. The firm of Warner and Sons, one of the two factories which survived, moved to Braintree in Essex with six families of Bethnal Green weavers in 1895; they made the coronation robes for George V and the present queen (Gibson 1958: 5-6). By Booth's time, a small area of western Bethnal Green behind the prosperous facade of Shoreditch High Street known as the Nichol (ca.1890 illus. in Keating 1971: pl 10) - fictionalized as the Jago in Morrison's _A Child of the Jago_ (1896) - had the largest concentration of Booth's lowest classes (including a considerable amount of his lowest class) in all London, and was a notorious centre for gang warfare, the Old Nichol Gang being famous (cf T.H. Smith 1959). Spitalfields also had a concentration of the lowest classes (Booth (ed) 1892-97: map 2).

In 1842 an estimate of the average age at death in different social classes in various centres gave that for the labouring class in Bethnal Green as 16 years. This was well under half the average age for the same class in rural Rutlandshire, which was 38 years; one year lower than the average for the labouring class in Manchester; and only one year above the lowest average of all - that for the same class in Liverpool. Figures for the tradesmen and gentry class are somewhat better than those in Manchester and Liverpool - the average age on death of a tradesman in Bethnal Green was 26 as opposed to 20 and 22 for those in Manchester and Liverpool respectively, while the average age at death for a gentleman in Bethnal Green was 45 compared to 35 in Liverpool and 38 in Manchester. In Rutlandshire the average age at death for a tradesman was 41, for a gentleman 52 (E.P. Thompson 1963: 365, 1968 ed). (This gross disparity continued throughout the C19 - in 1893 the Registrar General calculated that a Manchester-born man living in Manchester had a life-expectancy at birth of 27.78 years as compared to 43.66 years for the country as a whole and 51.48 years for the healthiest areas of the country, which were mostly rural (Lampard 1973: 20).)

An idea of the rapid growth of population in the area last century and the almost unbelievable overcrowding in this period can be obtained from studying the census figures for last century, and before that various contemporary references, and comparing them with the figures for the same area today. As noted above, Bethnal Green was said to have a population of 15,000 in 1,500 houses in 1740, and alarm was already being expressed then about the better classes leaving the area, but in the mid-C18 Bethnal Green parish could also be described as having "the fact of a country affording everything to render it pleasant, fields, pastorage [sic], grounds for cattle, and formerly woods and marches [sic]"; and in 1800 over half the parish was still farmland (quoted in Townsend 1957: 21-2, 1963 ed). Between 1801 and 1841 the population of the parish of St Matthew in Bethnal Green increased three-and-a-third times - 22,000 to 74,000. In the registration district of Stepney during the same period the population increased two-and-a-half times - from 35,000 to 91,000 - as the large remaining areas of rural Stepney were rapidly developed (Imray 1966; cf Truman 1963: passim). In the parish of All Saints, Poplar, the population increased fivefold - 4,000 to 20,000 - during this period.

Unfortunately, in the second half of the century there were boundary changes in the census districts, but in Bethnal Green, where the area remained virtually the same for censuses from 1801 to 1951, the 1841 figure - 74,000 - had jumped to 127,000 by 1881. In 1901, after a generation of growing public consciousness of slum conditions, the figure was still 108,000 (Townsend 1957: 22, 1963 ed), whereas by 1951 it was only 58,000 and by 1964 (Willmott 1966: 17, 1969 ed) only 46,000 (cf graph of Tower Hamlets population 1801-1971 in Lee 1972: 26 fig 6). In Poplar, the Registration District (as opposed to All Saints, which was a subdistrict) was rather less in area in 1881 from what had been in 1841 but the population had multiplied five times - from 31,000 to 157,000 - and for almost the same acreage in 1951 the population was down to 74,000. The following table (taken from information supplied by General Register Office, Somerset House, London) gives the detailed figures:

		Acreage	Population
Stepney registration district	1801	1,257	34,909
Stepney registration district	1841	1,257	90,687
Parish of St Matthew, Bethnal Green	1801	760	22,310
Parish of St Matthew, Bethnal Green	1841	760	74,088
Civil Parish of Bethnal Green	1881	755	126,961
Metropolitan Borough of Bethnal Green	1951	760	58,353
Registration District of Poplar	1801	2,918	8,278
Registration District of Poplar	1841	2,918	31,122
Registration District of Popular	1881	2,335	156,510
Metropolitan Borough of Poplar	1951	2,346	73,579

A more detailed breakdown of two East London Registration Districts, those of Whitechapel and St George's-in-the-East, suggest that their increases had taken place by the 1850s and that in fact after that date the population totals fell slightly (Leech 1967: 8-9, 17 table B). In Whitechapel the population, after rising from 57,000 to 80,000 between 1801 and 1851, had fallen to 71,000 by 1881; while in St George's-in-the-East the population, after more than doubling between 1801 and 1851 - 21,000 to 49,000 - reached a plateau in the 1850s and had fallen slowly from 49,000 to 47,000 by 1881. In fact, the continuing inflow of newcomers in the second half of the century - first Irish, then Jews - was not quite balancing a continuous outflow of East Londoners to points farther east - the 1880s and 1890s in particular saw the great build-up towards the river Lea. This agrees with Sinclair's observation and those noted by Inglis and quoted earlier regarding the movement of the middle-class businessmen to less squalid surroundings from the middle of the century onwards.

However, what was increasing throughout this period and causing perhaps the greatest squalor was the number of people per house. Between 1841, when the first figures are available, and 1881 the figure for Whitechapel rose steadily from 8.12 to 9.48, and for St George's-in-the-East from 6.91 to 8.16. In the Spitalfields subdistrict of Whitechapel the figure was 11.28 in 1881, and in the St John's subdistrict of St George's-in-the-East 10.28 in the same year (Leech loc. cit.). At 53 Old Nichol St in Morrison's Jago 90 people lived in 10 rooms; in 1889 the death rate in the Nichol was 40 per 1,000, nearly double the rate for Bethnal Green as a whole and four times that for the rest of London (T.H. Smith 1959: 41). As noted earlier, the Nichol had the highest concentration of Booth's lowest classes in all London, and Morrison was probably not exaggerating when he wrote

> What was too vile for Kate Street, Seven Dials, and Ratcliff Highway in its worst day, what was too useless, incapable and corrupt - all that teemed in the Old Jago (1896: 2).

In 1895 the London County Council was just starting slum clearance in the Nichol (the start is alluded to in A Child of the Jago) with its Boundary Street Improvement Scheme, which covered an area slightly larger than

Morrison's Jago (Boundary St - Morrison's Edge Lane - the western edge of the Jago, runs north-south roughly parallel to Shoreditch High St and immediately east of it), and statistics collected at that time for the area are relatively more favourable than they would have been for the Nichol proper. As it was, the Boundary St area comprised 20 streets, the average population per room being ca.2-1/4 and 107 rooms having 5 or more inhabitants each. The widest street or court was 28 ft across and in very many cases there was a great difference between street level and the level of the ground floor of the houses, some of the latter being 18 ins below the former. A large number of the houses had no backyards. Of the 730 houses, 652 were occupied "wholly or partly, by persons of the labouring classes", and of the remainder 12 were public houses or beer shops, 21 were shops and factories, 2 were lodging-houses with a total of 153 beds, and 43 were empty. The population exclusive of those in the lodging-houses was 5,566 - 3,370 adults and 2,196 children - occupying 2,545 rooms (quoted in Keating 1969: 25-26).

The inevitable result of this sort of overcrowding was the rabbit-warren of alleys, lanes, and courts between streets and in blocks leading to hovels often built in what had originally been gardens (cf Bezodis *et al.* 1957: 5; T.H. Smith *loc. cit.*) entirely disregarding what planning laws there were (cf Steffel 1970); and the subdividing and mass-overcrowding of old and originally respectable properties. Beames, writing of the London rookeries in the middle of the C19, while noting that much slum property was shoddily built from the first, also points out that

> A large class of the genus Rookery, are very ancient houses, deserted by those to whose ancestors they once belonged....In the dingiest streets of the Metropolis are found houses, the rooms of which are lofty, the walls panelled, the ceilings beautifully ornamented, (although the gilding which encrusted the ornaments is worn off,) the chimney-pieces models for the sculptor....The names of the courts remind you of decayed glory, - Villers, Dorset, Buckingham, Norfolk, telling of the stately edifices which once stood where you now breathe the impure atmosphere of a thickly-populated court. A street, now remarkable only for its narrowness and dirt is called Garden, because there was a garden there;....(Beames 1850: 16-17, 1852 ed).

Thus appeared the phenomenon of facades of higher-class houses on the major streets juxtaposed with the slums of the very lowest classes immediately beyond them (cf Dyos 1961: 109-13).

The most notorious area of East London in the earlier C19, or at any rate that most known to the curious of the time, was Ratcliff Highway. This street, where Stow had noted houses replacing the elms along it shortly before he was writing in 1598 (see p.366 above),[13] was renamed St George's St in the late C19, but part of its old name was restored in 1937 and as The Highway it was extended east, incorporating streets formerly under other names, through Shadwell and as far as the Regent's Canal Dock. Ratcliff Highway proper was the western section, running from East Smithfield to modern Garnet St (until 1939 New Gravel Lane). Now a street where the observer "is likely to find himself alone, flanked by derelict land and a low brick wall", it was 100 years ago full of

> crowded dancing-saloons and rifle galleries, photographers' booths and boarding-houses...a great night-time pleasure-strip, drawing sailors of many nations - red-shirted Americans, "chewing indefatigably", Chinamen and Lascars, "smoking Trichinopoly cheroots", "shivering" Italians, "piratical-looking" Greeks (Samuel 1973: 123).

Sinclair (1950: 107-8) talks of the public houses "which grew like barnacles in the Ratcliffe Highway" for much of the C19 until migration, social welfare work, and slum clearance began to reduce customers and the more prosperous Commercial Rd became the street of the pubs. In 1811 Ratcliff Highway became celebrated as the scene of a Regency Jack the Ripper-style series of murders (Critchley and James 1971) - the alleged murderer, who apparently comitted suicide while under arrest, was buried, as was the custom with suicides even this late, with a stake through his heart at the cross-roads of what are now Cannon Street Road and Cable St - and from the 1820s until well into the 1860s it was the area where young bucks went, latterly accompanied by a local detective and professional bodyguards, to indulge in the vicarious pleasures of observing sailors of all colours and nationalities, prostitutes, squalor, fights, and drunkenness (Keating 1971: 120-1, 277 n.62 and 1973: 587-9).

Even by this time, however, Ratcliff Highway was not as bad as it had been the previous century. An observer in 1824 noted that great though the mass of poverty and misery was in East London, there had been, "except in the very worst of these places and among the most wretched of the wretched...considerable improvement", while in the "leading streets" - in which list was included Ratcliff Highway - "the improvements [have been] in all respects great". The major improvements, it was said, had resulted from the building of London Docks (in 1805), for which a large number of miserable houses had been pulled down and streets widened; and the replacement of most of the old wooden houses by brick structures "commencing about forty years ago" [i.e. ca. 1784]. The great conflagration of 1794, caused by a kettle of pitch boiling over and setting fire to a barge of saltpetre which blew up and ignited the saltpetre warehouse of the East India Company, had burnt down some 600 houses in the area, including much of Ratcliff Highway; and this too had allowed rebuilding in brick and street-widening (George 1925: 345-6 n.125, 1966 ed; cf Critchley and James 1971: 10). Even so, in the middle of the last century, Beames, describing the Ratcliff Highway area (1850: 91, 1852 ed) was able to say that "Among those districts which bear away the palm of vice, misery, and filth, there is perhaps none more famous than that part of London which lies between the Tower and Isle of Dogs", and went on to describe that the part of "this Cimmerian region...bounded on the South by the Thames, on the West by the Minories, on the North by the Commercial Road, [and] on the East by the basin of the Regent's Canal". When one reads the contemporary evidence that much of East London and its population were noticeably better off in the early C19 than in the preceding century (George loc. cit.) one wonders just how bad conditions must have been in the C18.

Dock speculation returned later in the C19 as larger docks were built farther downstream in an attempt to catch more trade, but the shipbuilding industry itself was declining in the face of a more competitive industry in Glasgow and northern England. East London shipyards in the second half of the C19 were largely stagnating - at one time 3,000 skilled mechanics were employed in workhouses breaking stones (quoted in Sinclair 1950: 256-7). (Except where otherwise noted this section has been based largely on Cunningham 1897: chaps IV-VI; VCH Middx, II (1911); Spate 1936; Sinclair 1950 - occasionally inaccurate but extremely readable; Darlington and Howgego 1964; Pearl 1961: chapt 1; and Howgego 1967).

Pipemaking in London has been studied by D.R. Atkinson and A.H. Oswald (Atkinson and Oswald 1969). Makers are recorded in East London during the C18 (Oswald 1960a: *passim*; Atkinson and Oswald 1969: *passim*) and this, and some work by the writer on C19 London pipemakers with specific reference to the Ford family who exported pipes through the Hudson's Bay Company to North America (I. Walker 1971d: 23, 24 pl 2; for additional examples see Hoffman and Ross 1972a: fig 14b-d; 1973a: fig 7i-l; 1973b: fig 13a-f; 1974a: fig 8e-f), and also probably to Ghana (Calvocoressi MS), Ascension Island (Lefrancq *in litt.* 9 March 1972), and Australia (Allen and Macknight *in litt.* 29 March 1968); and to the Crop family or families of the same period, suggests that most of the pipemakers of this period worked in East London and in Southwark and Rotherhithe and the dock area immediately across the river from East London (cf Atkinson 1962: 187 fig 3; cf E.P. Thompson 1963: 869 n.3, 1968 ed; cf Atkinson and Oswald 1969: 216-25; cf Oswald 1970b: 229).

The Ford family appears to have been among the larger and more prosperous London pipemaking firms last century, having at one time three factories, two in Stepney and one in Pentonville, and a contract to supply the Hudson's Bay Company with pipes; and as the writer made a brief examination of the areas in which they worked (cf I. Walker 1969) and subsequently came in contact with a descendant of the family, it is intended to discuss these firms here as related to the economic background of the area to see what, if any, features may be regarded as typical of the industry at this time. In only one case does an actual premises appear to have survived (as a butcher's shop in what is now Durham Row), but in several cases dwellings typical of the area still exist either on the opposite side of the road or close by on the same side, so that some idea of the area as it was last century may be had.

One branch of the Ford business, successively known as John Ford, Jesse and Thomas Ford, and Thomas Ford (and occasionally as Ford and Company) of Stepney, is first recorded in the London trade directories at White Horse St (changed in 1938 to White Horse Rd) in 1823, and is last recorded - in the same premises - in 1909. During this period the family at one time also had a factory in the Mile End Rd, and John Ford also set up a business in North St (now part of Northdown St), Pentonville, which was eventually taken over by a son-in-law, Ebenezer Church sr. According to a trade-card in the possession of a great-granddaughter of John Ford, however (copy in possession of this writer), the business was established in 1810, and though it is not sated that this was in White Horse St, family tradition has always said this was so (Miss E.J. Church in litt. 30 September 1973). The John Ford recorded in 1821 as an Assistant of the London pipemakers' guild (Robinson and Spence 1937: 203) - a position which at least in the C17 was held for life - was probably this John Ford, in view of his apparently prosperous business, although the directories do note another John Ford (assuming this is not a third factory of the same John Ford) at New St, St George's-in-the-East, 1830-33 (see below). Among the papers in the possession of Miss Church is a remembrance card (copy in this writer's files) for a Jesse Ford who died 6 July 1868 aged 58, while a book in Miss Church's possession has an inscription noting a Thomas Ford of Stepney dying 28 December 1874 aged 62: Miss Church does not know to whom these refer, but almost certainly they are the Jesse and Thomas Ford noted above as John Ford's successors at White Horse St. One would have assumed them to have been sons of John Ford, but Miss Church (in litt. 1 January 1975) notes that in a paper written by a member of the Church family it is stated that Sarah Ford (Ebenezer Church sr's wife) was the only child of John Ford to survive infancy. As Jesse must have been born in 1809 or 1810 and Thomas in 1811 or 1812 they could have been brothers of John Ford (who died 6 July 1872), but if so the family's traditional date for the founding of the business, 1810, may have to relate to the generation before John unless he was born before ca.1790. (There is some confusion in the early directory entries as to which house Ford occupied - numbers 26 and 36 are variously listed, but after 1832 until the street is renumbered the number is given as 36 and it is likely that 26 is a misprint; a book belonging to Miss Church's father has written on its inside cover the name John Ford and the address 36 White Horse St, Stepney (Miss E.J. Church in litt. 1 January 1975). From 1867, following a renumbering of White Horse St, the premises became number 49.) The 1813 (third) edition of Richard Horwood's plan, which gives the street number of many houses, identifies this property; the site is shown occupied on John Roque's plan completed in 1745, on Gascoyne's plan of Stepney parish in 1703, on Morden and Lea's survey of London ca.1690, and on a survey of lands held in East London by the Mercers' Company in 1615 (reproduced in simplified form in Imray 1963: 102-3; I am grateful to the Mercers' Company for sending me a copy of the original);[14] inhabitants of White Horse St are referred to in the early C17 (Hill and Frere (eds) 1891: passim). Clearly what is now the lower half of White Horse Rd (as late as 1813 the northern half was largely unhoused) existed long before the C19 build-up of the area: geographically it was part of Ratcliff hamlet and as it was the road from the north to the the river it probably dates from medieval times. The buildings in FIG 133, directly opposite the site of Ford's premises, are likely to date to ca.1820 (information from A.F. Kelsall, Greater London Council Department of Architecture and Civic Design, to whom I am much indebted for a discussion of the dating of the various buildings discussed here - cf Imray 1966: 4 n.1 where it is noted that White Horse St was redeveloped between 1820 and 1850.) It is extremely likely that Ford's property looked identical, particularly as it lay between two public buildings of later construction and is thus unlikely to have been part of a major subsequent rebuilding such as that almost opposite (FIG 134) and datable to ca.1855. Unfortunately its site was never owned by the Mercers' Company, so that details of the property and any rebuildings are not included in the Mercers' Company's detailed material relating to this area.

In 1841 the Fords took over the premises in Wentworth Place - after 1863 part of Mile End Rd - of another pipemaker, Thomas Balme (FIGS 135-136) suggesting business was expanding, and they continued to hold both this and their White Horse St premises until 1905 (with an apparent break from 1876 to 1879, when there seems to have been considerable reorganization within the firm). The trade directory entries list the firm as an exporter from 1856, with the exception of the years 1878 and 1879, until its closure in 1909; but in fact the Hudson's Bay Company records indicate the firm was their pipe-supplier from 1831 until at least 1870 (Krause 1969-70; subsequent Hudson's Bay Company records have not yet been studied). Balme had been in these premises certainly since 1826 and probably since at least 1805, so that this property, like the Fords' other factory, remained in use for pipemaking for about 100 years. Examination of Gascoygne's and Rocque's plans (in which latter it is called Camel Row) suggest this part was built during the first half of the C18; de la Feuille's plan of 1680 (Castle and Fielding 1968: pl 1) has a tendency to straighten road lines, but does suggest that the Wentworth Place area was undeveloped though laid out in lots, and that the area immediately east was already developed. According to Kelsall the existing houses in the area date from the C18, some immediately to the east of Wentworth Place dating to ca.1725. Again, the evidence is fairly clear that Wentworth Place was far from a slum, although the tide of C19 expansion was soon to spread round and past it.

When Booth was making his detailed survey of London in the later 1880s he listed seven classes of people:

1. Lowest Class. Vicious, semi-criminal.
2. Very Poor, casual. Chronic want.
3. Poor. 18s to 21s a week for a moderate family.
4. Mixed. Some comfortable, others poor.
5. Fairly comfortable. Good ordinary earnings.
6. Middle Class. Well-to-do.
7. Upper-middle and Upper classes. Wealthy.

When one considers that Booth was able to have two classes below "Poor" (and "Poor" was defined as those living in poverty) the depth of squalor in the lowest groups may be guessed. Large areas of East London belonged to the three lowest classes, and the dock areas were almost solidly of the two lowest classes in many places.

Not all of East London was slum, however. To speak of the East End as being poor and the West End as rich is to oversimplify the situation considerably. A characteristic of East London, which is noticeable even today - though it is not unique to East London nor confined to the C19 (Dyos 1954: 76 and 1961: 36) - is the extremes of poverty and affluence sometimes literally touching each other. Considerable areas fell into Booth's fifth and sixth classes (though none in his seventh). Whitechapel Rd-Mile End Rd and Commercial Rd, for example, and even Commercial St in Spitalfields, were of classes 5 and 6, but they were a respectable facade for slums of narrow streets and alleys. Wentworth Place (69-103 Mile End Rd by Booth's time though his maps still use the former name) is of class 6, which indicates that the Ford premises there were considered prosperous even at the end of the century, when the clay pipe industry was dying. The immediately adjoining cul-de-sac of Eagle Place (changed in 1938 to Eaglet Place, demolished in April 1968) was of class one. The same differences, albeit a little less marked, are indicated for these two places in 1929, when a survey similar to Booth's was made (H.L.L. Smith (ed) 1930-5: map 1). White Horse St, and some of the immediately-surrounding streets, were in Booth's class 5, but the area to the north and east of St Dunstan's, the parish church, was predominantly of the three lowest classes, a feature still noticeable in the 1929 survey. This suggests - as is discussed in more detail later - that at least some of the earlier parts of Stepney parish remained to some extent an island in the sea of later C19 slums and semi-slums.

The indications, therefore, seem to be that the Ford businesses were in relatively respectable areas. In the late 1870s the company appears to have gone through a period of reorganization, perhaps when the second generation died; and in 1879, and for that year only, the Ford who took over the Mile End Rd and White Horse St properties the next year worked at 4 Church Row (now 5 Durham Row; the name-change took place the year of Ford's occupancy) immediately NE of the church and opening off White Horse St (FIGS 137-138). This property too is of Booth's class 5, and like Ford's Mile End Rd Property had been used previously for pipemaking - a James Strutt used it and number 2 during the period 1873-78 (Bloice in Atkinson and Oswald 1969: 224 says Strutton; correct name and confirmation of property number from J. Ashdown, in litt. 10 September 1970).

John Ford first appears at 28 North St (now part of Northdown St), Pentonville, in 1826 and is listed there until 1865. From 1857 to 1865 he is listed as an exporter. The business was continued by a son-in-law, Ebenezer Church, until his death at 56 in 1886, and after that by Ebenezer's widow, Sarah, until her death in 1893 at the age of 57. The directories do not record the Churches as exporters, but one of their address labels (in the possession of this writer) advertises "Pipes for Exportation"; however, no Church-marked pipes are known by this writer to have been found abroad so far (one mark known to have been used by the firm is the name CHURCH in plain capitals within a dotted rectangle (Atkinson 1962a: 187 fig 3 btm rt)). At least under the Churches the business was also known as the Pentonville Tobacco Pipe Works (same label) or the Pentonville Pipe Works (a business card in the writer's possession) or, as an 1879 price-list (also in the writer's possession) rather affectedly puts it, "Ye Pentonville Workes". From 1877 the business is listed at 27-28 North St, and from 1891 to 1894 at numbers 23-25 - Miss Church has an advertisement of a clearance by public auction to be held 7 July 1894 of the "stock, plant and utensils" from the factory (copy in writer's possession). A son of Ebenezer Church, also called Ebenezer, did continue to make pipes, however, and according to Miss Church's eldest sister (B 1901) their father John Church worked with his brother, the younger Ebenezer (Miss E.J. Church in litt. 3 February 1974): this Ebenezer Church is listed in the trade directories 1903-13 at 23 - after 1905, 23-1/2 - White Lion St, ca.1/2 mile east of North St. Miss Church's sister believes there were two kilns at the White Lion St premises; unfortunately the original building is no longer standing.[15]

The original premises at 23-25 North St also no longer exist, having been demolished ca.1934, but the surviving part of the street immediately adjacent (FIG 139) indicates a pretentiousness which suggests that it was originally designed to be eminently respectable. As the evidence of Horwood's 1799 and 1813 plans indicate that this street was being built only at the very end of the C18 and the first decades of the C19, it is clear that Ford was an early occupant, and it is perhaps surprising that a business such as pipemaking was carried out so early in the history of what appears to have been designed as a residential street. However, a George Benson is listed as a pipemaker in North St even earlier, from 1809 to 1811, though at what number is not recorded (it could possibly have been number 28, as a comparison between Horwood's 1799 and 1807 plans suggests this property was built between these two dates).[16] Certainly by Booth's time the street was of a lower class than those surrounding it, for it is placed in class 4 while its neighbours are of higher classes. Moreover, within the various blocks of these respectable houses were mewses and alleys populated by people of the lowest classes, yet another feature which had not fundamentally changed by the 1929 survey. (In Glasgow the pipemaking firm of A. Coghill is listed in St Andrew's Sq in 1826, the first year it appears, but thereafter for virtually all of its 78-year existence is at Ropewalk Lane (Appendix VII): St Andrew's Sq, part of the Georgian development of Glasgow, was laid out in the 1780s (Youngson 1966: 50) and one suspects that Coghill perhaps lived here or owned the property but was made to take his business to the older and poorer area of the city on the grounds that industry could not be permitted in a residential area.)

Other Fords worked at a premises in what is now the southernmost part of Cannon Street Road between 1836 and 1853, and the premises were thereafter used by other pipemakers until 1892. This part of Cannon Street Road (until 1859 called Cannon Street) was in existence as part of Wapping hamlet before 1700 (Morden and Lea's and Gascoyne's plans) - two houses from ca.1700 survived into this century (RCHM(E) London V (1930): 100, pl 15) - and it is interesting that Booth classifies it in his classes 5 (the west side, now demolished, where the Ford premises were) and 6 (the east side, still surviving with fragments of everything from ca.1780 to ca.1880, FIG 140). This is the only part of the immediate area to be rated so high, and suggests that like White Horse St, Cannon Street, predating the C19 building spread, clung to an earlier status. Admittedly, such an argument cannot be applied to the rest of older Wapping, for Booth put almost all the area south of what is now called Cable St into his four lowest classes, but Morden and Lea, Gascoyne, and Roque all indicate that Cannon Street was on the northern edge of Wapping. The area between Cable St and Whitechapel Rd was entirely open east of Back Church Lane (running north from Wellclose Sq) until White Horse St was reached. Even as late as 1813 the eastern spread had only moved from Back Church Lane to a little east of Cannon Street Road-New Rd, although Commercial Rd (largely on the line of the earlier White Horse Lane - not the present White Horse Lane) had been built between 1803 and 1810 to serve the India Docks beyond Stepney and Ratcliff. Smith's 1929 survey indicates that the social position of lower Cannon Street Road relative to its surroundings had not fundamentally changed since Booth's time.

The prolonged use of a premises for pipemaking by several pipemakers noted in the Wentworth Place-Mile End Rd and Cannon Street Road properties also occurs with a premises in what is now Cable St between Swedenborg St and Betts St, a site being redeveloped in 1968. A John Ford is recorded - the address then being 30 New Rd, St George's-in-the-East - from 1830 to 1833, and two other pipemakers in turn occupy the property from 1842 to 1863 (cf Atkinson 1962: 187 fig 3 second-btm line). As the industry declined there must have been a number of pipemakers desperate enough for work to be willing to try to make pay a business which another maker had given up as a bad job.

Although Stepney parish had been affected by the expansion on its south along the Thames before 1600 and had slums by 1650, large areas remained unhoused until well after 1800, as Horwood's 1813 plan indicates. There is little built-up round the parish church by 1813 other than that there since before 1690. The upper part of White Horse St, where it approaches the church, was still largely unhoused and totally in open country in 1813. It was only in the succeeding years that the rapid tide of humanity spread through and beyond the area: by 1847 (Cruchley's New Plan of London and its Environs, edition of that year) the area between Whitechapel Rd-Mile End Rd and Cable St was built solidly past White Horse St as far as the Regent's Canal, a mile's progress in 34 years (some details of this development are given in Imray 1966 and Truman 1963; cf Castle and Fielding 1968: pl 2 - Rocque's 1769 plan - and pl 3 - Davis's 1851 plan).

Even the part of White Horse St south of Commercial Rd (now the extreme east end of Cable St) was in Booth's class 5, as were some streets in the immediate vicinity; in the area where White Horse St and Commercial Rd crossed there were people of class 6. It seems extremely likely that the "fairly comfortable" people, with "good ordinary earnings" were the respectable, so to speak, inhabitants of the older area on the northern outskirts of Ratcliff who stubbornly held on, and apparently prospered relatively well (cf Sinclair 1950: 314). The lower part of Cannon Street Road may also fall into this type of category. The clarity with which parts of these two areas are defined - particularly the east side of Cannon Street Road and the part of White Horse St south of Commercial Rd - certainly suggests that these areas had a strong tradition behind their difference from neighbouring areas. (It should not be thought, of course, that older areas always remain respectable when lower-class exansion swallows up a formerly separate entity, but often the older generation live out the remainder of their lives in an approximation of their earlier ways while the younger move to more respectable suburbs farther out. Booth noted that recent immigrants to London were much more willing to move to the characterless suburbs than were the old-time residents of the central districts (noted in Wohl 1971: 44 n.13). If ties of family or social life are strong - and in East London they are (Young and Willmott 1957: passim, esp. chapts 3 and 7, 1962 ed; Townsend 1957: passim, esp. chapts 3, 4, 15, 1963 ed) - this conservatism may last for several generations.)

Another London pipemaking family which achieved considerable fame last century was that of Crop (cf Fresco-Corbu 1964: 1289, fig 3; 1967: 1474 and 1477). (Though the name more frequently appears spelt Cropp (e.g. Bloice in Atkinson and Oswald 1969: 218), all pipes with this name seen by this writer have it spelt Crop. No Crops appear in the 1969 London telephone directory, and only six Cropps. Of the five of these latter who replied to letters sent, three were related and none knew of any connection with the pipemaking firm.) According to Harley (1963: 19), who is not a reliable source, the family made pipes "from about 1850 to 1910", and on his retirement the last Crop destroyed all the family moulds and took the secret of his pipe-colouring with him to his grave. This pipe-colouring technique and some of Crop's products are discussed in 2: VII, but it can be repeated here that the more elaborately-modelled bowls of the firm were of superb quality. Crop pipes must have been widely sold - a plain example is known from Sydney, Australia (Miss A. Bickford in litt. 12 July 1969) - and it was probably this reputation which enabled the firm to leave the slums of Hoxton (cf Sinclair 1950: 334-6) and continue working until 1924 in the somewhat better district of Homerton in outer NE London. In this case, unlike that of the Fords, success appears to have brought a desire to move to a less squalid area.

The early history of the Crop family is confused by multiple directory entries all of Charles Crops. One is listed in Great James St (now Purcell St) from 1856 to 1869 and another, presumably a different one, from 1856 to 1864 in Turner Sq (now demolished, but sited immediately south of Great James St). Booth classifies this area as predominantly Class 4 and lower. For the single year 1865 a Charles Crop appears in Mortimer Rd, north of Hoxton and north of the Regent's Canal which so markedly enclosed the poverty of Hoxton and Bethnal Green; but if this was an attempt of the Turner Sq Crop (to judge by the dates) to move to better surroundings - Booth's classes 5 and 6 - it appears to have failed. (The relationships among these Crops are unknown; possibly, as with the separate Stepney and Pentonville John Ford entries noted above, some of these entries are separate entries for the same maker.) From 1870 to 1878 there is a gap in the directories, but in 1879 Charles Crop and Sons appear in Brooksbys Walk, Homerton, and continue there until 1924 (it is possible that the incomplete word HOMER- moulded on a bowl-fragment from the Hoyt-Barnun House site in Stamford, Connecticut (Poirier 1974: 13), originally read HOMERTON, in which case the pipe may have been a Crop product, though this writer knows of no Crop products which include a place-name in their mark). In the same year as the firm appears for the last time in the London trade directories, A. Dunhill (1924: 220) noted that the clay pipes still sold to some extent in "the little shops in poor neighbourhoods" generally bore the name Crop of London. Booth marked old Homerton as predominantly in his lower classes, but the area in general was of a better class than Hoxton.

The overall impression that arises from this admittedly extremely limited work is that the best firms managed to achieve some respectability and at the height of their business were at least moderately well off. The Stepney-Mile End Rd Fords, in relation to their surroundings, appear to have been quite well off indeed. However, there is every reason to suspect that the numerous other pipemakers in East London were anything but well off. Unfortunately it is not possible to say how many pipemakers listed were in effect one-man businesses: few can have been real companies, though the Stepney-Mile End Rd Fords and the Crops appear to have been in that category. Booth unfortunately does not include a pipemaker in his detailed examples of streets whose occupants represented his classes. The only occupation possibly socially near is a cigar-maker listed in a Class 4 street.

Two cigar-makers, a married couple, were listed among the 17 inhabitants of 29 Hanbury St near Brick Lane when Annie Chapman, one of Jack the Ripper's victims, were murdered in the backyard of that premises on 8 September 1888. The occupants of the premises are perhaps worth recording as representative of those of a relatively respectable rooming house for the area, in a street classified by Booth the previous year as Class 4. The property is described in the relevant volume of the LCC Survey of London as having been probably rebuilt for the first time ca.1740, the area having been built up by 1681-82. The house had been refronted in 1846 and was single-fronted, three storeys high, and two rooms deep, with a garret (Bezodis et al. 1957: 190, 192-3). In 1888 the front parlour was used as a cat's-meat shop, the woman who sold the cat's-meat at a farthing or a halfpenny a piece living in the room with her 18-year old son. The back parlour was used for prayer-meetings by the landlady. This woman and her 14-year old grandson lived in the front room on the second floor and a lawn-tennis bootmaker occupied the back room with his son, who was feeble-minded. On the third floor a carter, his wife, and their adopted daughter occupied the front room and the cigar-maker and his wife lived at the rear. In the garret a Spitalfields porter, his wife, and three children lived at the front and an old lady, kept out of charity, had the back room (noted in T. Cullen 1965: 71, 51, 1966 ed).[17]

As noted in 1: VII(e) when dealing with the development of cigarettes, the Russian and Polish Jews who settled in East London in the later C19 contributed greatly to the cigarette-making industry before mass-production of cigarettes by machine. This is another example of the East London tradition for small craftsmen businesses; in this case it probably contributed to the decline of pipemaking there. By a coincidence, the courtyard off Berner St (since 1963 Henriques St) on its west side north of Fairclough St where another of the Ripper's victims, Elizabeth Stride, was murdered on 30 September 1888 was occupied on one side by a row of cottages where tailors and cigarette-makers worked and on the other by an educational club used by Russian, Polish, and German Jews (T. Cullen op. cit. 104). Booth had classified Berner St where it was not commercial premises as Class 4; the particular courtyard where the cirgarette-makers worked was too small to be shown on his map but Batty's Gardens to the north is, and characteristically enough of such back alleys had a markedly lower class of population than the thoroughfares. In this case it was marked Class 2 and it is likely that the cigarette-makers and tailors living at the scene of the murder would have been of a similar class.

Clay pipemaking last century must have been in something of a cleft stick, engaged in a losing struggle against other forms of smoking and faced with the fact that there was only so much one could charge for pipes if one hoped to sell them. Indeed, the only point the makers could really emphasize was their cheapness, and it was the search for ever-cheaper labour which no doubt reinforced the concentration of pipemaking businesses in slum areas, whether in East London, eastern Montreal, Glasgow's Calton, or St

Jude's in Bristol. The fact that the Rainford clay-pipe industry flourished at a time when that in nearby Liverpool had declined must have been largely due to cheaper labour being available in the country districts than was available even in the poorest parts of Liverpool. Makers, paid piece-work (this appears to have been the usual practice), had to make a large number to earn a living, yet fewer pipes were being sold.

Yet paradoxically, East London was last century - indeed to a considerable degree still is - ideal in some respects for a business such as clay tobacco-pipe manufacture: the last London clay pipemaking business, Edward Back, was listed in Old Ford Rd, in outer East London, until 1944. East London is still an area of small independent businesses (cf Willmott 1966: 110, 1969 ed) - indeed very recently (Martin 1966: 186) the making of wooden tobacco-pipes was noted in Stepney. The sweated small craft industries of the clothing and footwear trades in East London last century have been examined (P.G. Hall 1960: passim; 1962) and the East London character of other craft-industries had also been noted (Young and Willmott 1957: 90-1, 1962 ed; Lonsdale: 1962). Lonsdale, talking of the Jews in the clothing trade who settled especially in Stepney in the second half of the C19, noted the "Jew's desire to be independent and his own master, which inevitably tends to perpetuate the organization of the industry on this small-scale basis". Workshops, she noted, were built in the backyards of their homes, and the master tailor had two or three employees - by this time the old domestic system of using the family in the business was less common (Lonsdale 1962: 93, 92; cf Leslie 1963: 77).

This small craft-industry tradition of East London goes back centuries before this, however: their concentration and that of the small independent businessman in the area is clearly an East London tradition, traceable to beginnings 500 years ago, as already noted, and continuing in the industries and street-markets of today; but the very structure of East London lends itself to (and of course is also caused by) this tradition (cf R.K. Lee 1972: 41). A small business can be more mobile than a large one, and in this may lie its life, for it can move from one short-term property to another when a larger firm may find itself unable to move (cf Sinclair 1950: 310; also Eversley 1972: 56). P.G. Hall (1960), discussing the locations of the clothing trades in London - one of which is in East London - notes that the critical factor is close contact with the metropolitan market: the luxury retail market of the West End is the origin of West End tailors - Regent and Bond Sts, for example - while the wholesale market of the City is the origin of the East End industry in an area where demand and supply for cheap labour last century was almost unlimited. Once established in an area, an industry tends to generate its own pool of available labour; hence not only the quartiers of the clothing trade in London, a trade already associated with the eastern edge of the city before 1600 (Ben Johnson quoted in P.G. Hall 1960: 167), but the areas in Shoreditch and Bethnal Green of the furniture-making trade (cf Oliver 1961), that of watch- and precision tool-making in Clerkenwell, that of gold-and silver-working in Hatton Garden, and those of the printing trade in the City and Finsbury. Such quartiers are not confined to London - there are similar areas in Birmingham for the jewellery and gun trades (Wise 1951; D.M. Smith 1964) and there are now-defunct silk-weaving quartiers still traceable in Coventry and Macclesfield (D.M. Smith 196[illegible] 106).

Granted that clay pipemaking is much less sophisticated than those trades, the cheap labour, the available working-class market, and the advantages of a traditional manufacturing area are as likely to apply to it as to any other trade. Further, pipemaking, like these other trades, involves the production of small items in small premises, and like them is essentially a home industry requiring a minimum of equipment. D.M. Smith describes the premises of one of the gunsmiths working in the Birmingham gun quartier in 1962 as follows:

> The main feature of the workshop is a long bench beneath the windows, which are augmented by a skylight in the roof, the only other source of illumination being adjustable electric lights above the bench. On the side of the bench is a vice, and within easy reach an enormous range of files and other small tools, many of which were made by Mr. Draper as he required them. The workshop also contains a chair and a desk from which the clerical side of this one-man business is run, and drawers and shelves for screws, components, and a variety of miscellaneous bits of metal. In such conditions have been produced guns which have spread the fame of Birmingham's craftsmen throughout the world (D.M. Smith 1964: 115, pl 28).

Describing another gunsmith's workshop in the same area, Smith notes (1964: 117):

> The simple inscription 'J. POPLE' above the door in letters barely 4 in. high was the sole indication of who occupied the premises. Such modest nameplates are characteristic of the very small concerns, and seem perfectly in keeping with the nature of a trade in which the individual's particular occupation and the skill with which he performed would be known simply be reputation.

A similar professional modesty characterized Pollock's factory when this writer finally located it (cf B. Rogers 1973: 26).

An account of the Birmingham jewellery and goldsmithing trades published in 1866 noted that

> All that is needed for a workman to start as a master is a peculiarly shaped bench and a leather apron, one or two pounds' worth of tools (including a blow-pipe), and for material a few sovereigns and some ounces of copper and glue. His shop may be the top room of his house, or a small building over the washhouse at a rent of 2s or 2s6d per week, and the indispensable gas jet, which the Gas Company will supply on credit (quoted in Wise 1951: 62).

About 200 years earlier the same sort of description was made of a blacksmith in the same industrial Midlands: the basic equipment comprised an anvil, stiddy, bellows, and an array of swages, jacks, planes, gouges, and clamps which demanded little outlay and, apart from the bellows, little maintenance. The value of the work "lay in the skill of the workmen who turned out large quantities of goods at great speed, and a high degree of standardization" (Rowlands 1968: 39). A description for a pipemaker would have been strikingly similar to these descriptions: in 1850 in Bristol, when the industry there appears to have just begun its final decline, an anonymous observer noted that "so soon...as a family can accumulate funds to enable them to set up an oven and purchase a mould and a little clay, it is not unusual for them to do so, and manufacture for themselves" (the Examiner 17 August 1850; see also 6: VIII).

One feature which has been noted elsewhere but which so far has not yet appeared in this admittedly preliminary survey of East London pipemakers is the association of Irish immigrants with pipemaking. Irish immigrants have been recorded in London from the early C17, and in the closing decades of the C18 and the early decades of the C19, bad harvests, political unrest, and Irish mercenaries released from the Napoleonic Wars added greatly to the total long before the potato famine drove even more to leave Ireland in the later 1840s and the 1850s. However, a preliminary survey of occupations listed for Irish in East London in the 1851 census, while listing labourers to silversmiths to teachers for men and prostitute (one gave her occupation thus) to field labourers to domestics for women, mentions no pipemakers (J.A. Jackson 1963: 105-19).

A surprising thing about East London pipemakers is that some of their premises did remain in use for so long, which might suggest that some businesses were healthier than might have been expected. It is more likely, however, that it indicates a number of pipemakers desperately trying to make a success of a dying business to earn a livlihood - as the industry was contracting it is likely that there were many out-of-work pipemakers trying to continue their trade and prepared to attempt to make a living from a business which had previously failed. An account in 1819 of nailmaking in Wolverhampton, noting the decline of the independent artisan, observed that

> The order of things...is completely inverted. Now, the last resource of the starving journeyman is to set up master; his employer cannot find him work, on which there is any possible profit, and is therefore obliged to discharge him; the poor wretch then sells his bed, and buys an anvil, procures a little iron, and having manufactured a few articles, hawks them about...for what he can get.... He might have previously received 10s a week as a servant; but now he is lucky if he gets 7s as a master manufacturer (New Monthly Magazine, 1 July 1819, quoted in E.P. Thompson 963: 287, 1968 ed).

That precisely this reason lay behind the appearance for a few years of new makers in the dying decades of the pipemaking industry, both in East London and for example Bristol (see 6: VI), seems certain. John Frederick Bryant jr of Bristol, talking of his business there during the early 1780s, also noted the profit he and his wife made from their business was not as great as what they would have earned as journeyworkers but that the hope of improved business kept them optimistic (Bryant 1787: xxv). A less successful example of an employee setting up in business for himself is recorded by Sturt of a Surrey wheelwright ca.1884: probably ignorant of the fact that carts were already being sold locally for less than cost price and that it was jobbing - the repairs - which enabled businesses to survive, he began building new carts for a pound or so less than the local price and had to close down within a year in the face of bankruptcy (Sturt 1923: 199-200, 1963 ed).

It may well be, however, that smaller manufacturers than the Fords did find temporary relief in small properties - and many of the East London lots are small - which would be cheaper, or in slum premises or obsolescent or condemned premises while larger firms would have had to search for capital and permission to demolish property and build a factory. From the evidence of the Montreal industry it certainly seems that pipemakers could move around frequently and still remain in business. Two or three men and a roomful of equipment are not difficult to set up over again; indeed the only major expense would appear to be the erection of the kiln, and the fact that until the C19 (and even into it and into the C20, as for example with Flanagan at Leicester) the industry could be run essentially as a home industry indicates the ease with which it could, if necessary, be accommodated in simple premises.

SECTION VII:
CONCLUSION

The brief coverage of pipemaking in these centres have necessarily been uneven, based as they have been only on readily-available works or sources. However, a number of points, which can be grouped in three major sections, are worth noting and may be of value when considering the Bristol industry.

First, though the C19 saw the virtual death of the clay pipe industry, its decline took place at different times in different places; and it may also be suspected that though the basic reason for the decline was the same in each area - namely a switch to other methods of taking tobacco - there were local and also social differences in this change. For example, the apparent end of prosperity in the Liverpool industry in the 1830s certainly cannot have been due to a preference for brier pipes or cigarettes, for as noted in 1: VII(e) and (h) these did not appear until the 1850s: there is some evidence to suggest Liverpool's decline was due to a popularity of cigars. On the other hand, the general sudden decline of the industry in England in the period 1850-70 as indicated by Oswald from numbers of makers recorded is plausibly connected with the appearance of the brier pipe and to a lesser extent the cigarette.

If we can believe contemporary observers, cigars were all the rage ca.1830 but by the 1840s and 1850s the short clay was in vogue. However, it is stated in 1859 that cigars were accounting for over half the tobacco consumed in the larger centres in the country, which suggests that cigars were still more socially acceptable than pipes but that pipes were generally popular. By 1900 it is stated four-fifths of the tobacco consumed in the country was pipe-tobacco, which indicates that the pipe had entirely regained its traditional standing and that the cigarette was not nearly as common at that time as contemporary remarks might lead one to believe. Similar exaggeration is probably reflected in the references to cigars in the 1820s and 1830s and to the cutties in the following two decades, but it is clear that by 1900 pipe-smoking was again the normal method of taking tobacco in England, and had presumably been returning to popularity throughout the second half of the C19. The steady increase in the number of pipemakers recorded in Leicester from the beginning of the C19 to the 1850s also suggests this, and while undoubtedly the industrial growth of Leicester at this time must have stimulated the market, the rapid rise in the number of pipemakers recorded in Lincolnshire from 1815 to ca.1850 (P.K. Wells in litt. 17 April 1969) cannot be attributed to any concentrated industrial development in this rural area and must reflect the general population growth throughout the country at this time and the increasing desire of sections of this population to smoke pipes. Thus the clay pipe industry does not die because pipe-smoking went out; on the contrary it died as pipe-smoking was regaining its popularity and it did so because from the 1850s onwards a new and much more durable pipe - the brier pipe - was being introduced.

The brier was bought by the better-off and the fashionable - those who could afford the "expensive" price of 3s for a bowl in the late 1850s (Fairholt 1859: 198-9) and presumably the additional cost of a stem - which appreciably reduced both the market for, and the social status of, the clay pipe, the latter reinforcing the descending spiral. The market for clay pipes thus became one of those who could not or would not buy briers, and while Thomas Carlyle insisted on his Scottish-made long-stemmed clays and Conan Doyle records a clay pipe among those smoked by Sherlock Holmes,[18] an overwhelming majority of those who continued to use clay pipes must have belonged to the poorer classes. Catherine Eddowes, yet another of Jack the Ripper's victims, had two "short clay pipes" among her few worldly possessions when murdered on 30 September 1888 (quoted from The Times in Cullen 1965: 112, 1966 ed),[19] while Alice McKenzie, victim of a Ripper-style murder in East London in 1889 and another prostitute, was known as "Clay-pipe Alice" because of her habit of smoking a clay pipe in bed - when her body was found in Castle Alley (now the southern end of Old Castle St) off Whitechapel High St there was a clay pipe under it (Odell 1965: 98, 1966 rev ed and Farson 1972: 58, 1973 rev ed). The same year as the Ripper murders, 1888, Kipling's short story "The Madness of Private Ortheris" appeared in Plain Tales from the Hills, and the Cockney soldier Ortheris pours out his yearning for the slums of home:

> I'm sick for London again; sick for the sounds of 'er, and the sights of 'er, an' the stinks of 'er; orange-peel and hasphalte an' gas comin' in over Vaux'all Bridge. Sick for the rail goin' down to Box 'ill, with your gal on your knee an' a new clay pipe in your face (quoted in Keating 1971: 144)

which dramatically puts the clay pipe among the lowest classes, the English soldier of the time, as has been noted, being regarded as a social outcast "drawn from the unemployed or unemployable" and considered by the respectable working class as the lowest of the low (quoted in Keating 1971: 142). A correspondent in a recent issue of The Scots Magazine (vol 103 no 6 (n.s.) (September 1975) 659), recalling the days of the Airdrie and Coatbridge Tramways at an unspecified time but probably early this century, quoted a rhyme then current in which an ex-bricklayer's helper extolled his good fortune and social advancement in having obtained a job on the tramcars:

> Nae mair getting up at hauf-past six
> Climbin' up the ladder wi' a hodfu' o' bricks,
> Naie mair clay pipes, nothing but cigars
> Now I've got a job on the Coatbridge cars.

(Airdrie and Coatbridge are two industrial communities east of Glasgow; according to the same correspondent there was a clay pipe factory in Academy St in Coatbridge, but unfortunately he does not give the name.) Arthur Morrison, who wrote three famous books on working-class life in East London at the end of the C19 - Tales of Mean Streets (1894), A Child of the Jago (1896), and To London Town (1899)[20] - also noted a dichotomy in the lower classes between cigar and clay pipe: in A Child of the Jago the inhabitants of the Jago, the fictionalized Nichol in Bethnal Green and as noted earlier perhaps the worst slum area in London and famed for its gang warfare, smoke clay pipes (Morrison 1896: 92, 175-6) while the High Mob, a sort of modest Mafia of professional criminals who lived respectably, far from the Jago, but met the Jagos every Sunday at their local pub to conduct business, dressed in handsome gear, smoked cigars, and were regarded as a success to which all Jagos might hope to aspire (1896: 93). A superb photograph taken 2 September 1901 of the crew of HMS Indefatigable while she was coaling up at Halifax, Nova Scotia, shows a large proportion of the crew smoking pipes, with a scattering of cigarettes, and it is noticeable that whereas the pipes smoked by the officers and petty officers are briers those smoked by the men are overwhelmingly clays (Harper and Triggs (eds) 1967: pl 116).

By ca.1900 those who bought clay pipes in Leicester were miners and quarrymen, people belonging to the poorer working classes, extremely likely to have been conservative in taste and not the sort of people likely to change their smoking habits to conform to fashion even if they could afford briers. Sax Rohmer (Arthur S. Ward), the author of the Fu Manchu and similar stories, was presumably no profound observer of social classes, but in his The Quest of the Sacred Slipper, first published in 1913, he felt able to describe a group of men from a slum tenement in Waterloo Rd in Lambeth as all smoking clay pipes. Presumably, therefore, even as late as 1913 clay pipes were a typical way of smoking in the lowest classes. Arthur Morrison, who was a profound observer of social classes (Keating 1971: chapt 7), listed various stereotypes of East London in the Introduction - originally published separately in 1891 with some differences - to his Tales of Mean Streets (1894), one of which ran as follows:

> The East End is a place,...which is given over to the Unemployed. And the Unemployed is a race whose token is a clay pipe, and whose enemy is soap; now and again it migrates bodily to Hyde Park with banners, and furnishes adjacent police courts with disorderly drunks (Morrison 1894: 1-2).

In another story in the same book, a wife who had received a windfall of £100 decides to set up a drapery and haberdashery business and bask in the respectability of owning a shop, particularly a socially-respectable shop such as a drapery and haberdashery establishment, and at the end of the first day in the new business drags her husband in from the back yard where he has gone to smoke his pipe for the first time that day because she discovers his action could be observed from a neighbour's window, "the pipe being a clay" (1894: 115). In the early C20 the Poorhouse on the island of Mull supplied its inmates - of both sexes - with clay pipes and a weekly allowance of tobacco (Macnab 1972: 260).

There are hints that there tended to be an optimum number of makers at any one time in the various centres - for example, though a firm would disappear, its place (not necessarily its premises) would be filled by a new name, thus keeping the overall number of makers the same - but generally, when it came, the final fall was swift. It probably was so at Liverpool and certainly was so at Montreal and Edinburgh. In Lincolnshire there were two pronounced drops in the number of pipemakers recorded - one in the later 1850s, the other in the later 1860s. By 1870 the number still in business in Lincolnshire was one-third the number recorded in 1855 (P.K. Wells in litt. 17 April 1969). Only in Glasgow, where the industry was supported by a considerable export trade, was the decline slow, though there was a sharp fall there in the middle of this decline, during the period 1908-13.

In Scotland and Ireland the C19 appears to have seen both the rise and the decline of the clay pipe. In both countries the peak of the clay pipe industry as reflected in the number of makers recorded is in the 1870s and 1880s. There is evidence that the Irish exodus following the potato-famine in the 1840s gave a temporary boost to the Glasgow clay pipe industry and momentary resuccitation to the Liverpool and perhaps the Chester industries, all in the 1850s; it almost certainly brought about the foundation of the Montreal industry in the late 1840s.

The Chester industry, unlike the others, has already passed its zenith before the C19. Its height of prosperity appears to have been in the earlier C18; it appears to have maintained a reputation for superior-quality pipes until the end of the C18, and also to have made pipes specially for the West African slave trade. There is evidence to suggest that its industry fell to the mass-production of Liverpool, where the industry has a very rapid expansion from the 1760s onwards. This last point also emphasizes the individuality of regional industries, for during the second half of the C18 - indeed starting probably soon after the beginning of the century - smoking declined in favour of snuff certainly among the upper classes, and that this was a marked nation-wide trait is reflected both in the decline in the number of pipemakers recorded in England and in a decline in the volume of tobacco consumed.

Secondly, there appears to be a tendency for pipemakers to concentrate in certain areas - East London in general, more particularly in Glasgow's Calton, in Detroit, and above all in Montreal where virtually all the makers concentrate in an area about half a mile square. All these areas are poor and at least semi-slum in large parts; in some cases they were extremely bad slum areas. A similar ghetto tendency has been noted among C19 Boston pipemakers and may indeed date back to an earlier period, for a Pipemaker's Lane in this area, while first recorded in 1818, has no known association with C19 pipemakers and may therefore have received its name from C18 or even earlier activity in the area (P.K. Wells, paper given at the Spring Conference of the Society for Post-Medieval Archaeology at Lincoln, March 1969; P.K. Wells 1970: 21; 1972: 15-16 and fig 8). In the C19 there were similar concentrations of pipemakers in Bath, in the first half of the century in Bridewell Lane and in the 1850s a sudden move to Milk St, where there was a dense concentration in the 1860s and 1870s (Brown and Brown 1974: 25, 27-8).

This tendency appears to have been universal among pipemakers - Jean-Léo (1971: 27) notes that at Morlaix (Finistère), on the north coast of Brittany, an alley was called Venelle-aux-Pipes because so many pipemakers lived there at one time. Occasional evidence for the C19 - for example in Glasgow and one case in Montreal - suggests that the proprietors of large firms could live in residential districts or fashionable country areas, but this is the exception rather than the rule, for though there were large firms operating last century it is likely that most pipemakers worked in an essentially family business and home industry. This probably explains why a number of pipemakers - and nearly all of those in Montreal - were able to move premises repeatedly and still stay in business: essentially they were moving a work-bench or two and a chestful of tools, and certainly in some cases the kiln used was so primitive that it was partially rebuilt for each firing and thus could be abandoned with minimal loss. However, in both

Glasgow and East London the same premises could be occupied by a number of pipemakers, either consecutively or intermittently for periods of up to a century.[21]

In London at least there seems to have been a desire to keep pipemakers out the City - this may have been because its being a home industry, with a kiln perhaps in the house, was regarded as a fire-hazard. In East London and Glasgow's Calton it is noticeable that the industry keeps outside but not far from the city boundaries, no doubt to avoid guild and similar legislation and probably for cheaper labour. In the first half of the C19 the Rainford industry continues to flourish after that in nearby Liverpool has declined, probably because cheaper labour was available. As is noted in 5: I, Glasgow and Edinburgh pipes in the mid-C19 appear to have been much cheaper than certain fashionable London ones - a 21-ins pipe from the former centres cost approximatly the same as certain London cutties in the middle of last century: this may mean Scottish labour was cheaper, especially as it was a longer journey to take the clay from Devon to Scotland than to London.

Early pipemakers, especially those who emigrated to The Netherlands and founded the Gouda pipe industry, appear to have often been nonconformists - the significance of this is probably that nonconformity was strongest in poor areas (as was certainly the case with East London from early times) and among poorer people.

The third point is trade. As already noted, Chester made pipes especially for the slave trade; it may be suspected that as the Chester industry declined and the Liverpool industry rapidly exanded the latter took over this trade - certainly by this time Liverpool was the leading British slaving port, and pipes for the same trade are known to have been made in France. In the C19 and indeed until its last firm closed in 1967 Glasgow had a number of foreign ties: during the second half of last century Glasgow pipes dominated the North American pipe market despite the Montreal industry of the same time, and Glasgow pipes have been found in Australia and Easter Island and are known to have been traded to Africa. Nineteenth-century and late-C18 Liverpool pipes have also been found in North America, and in Ghana; East London pipes were used by the Hudson's Bay Company in North America last century and pipes from the same manufacturer appear to have reached Ghana, Ascension Island, and Australia. Occasionally, Edinburgh pipes also reached North America.

CHAPTER 5

PRODUCTION COSTS AND WAGES

SECTION I: PRODUCTION COSTS

Evidence for production costs, either past or present, is hard to come by; and what there is is widely scattered both geographically and in time. Because of this it is difficult to make any meaningful deductions from the data available, and while comments on certain features and trends which may arise will be attempted, the primary function of this section and the next (on wages) must be considered simply as a place to collect what evidence there is on production costs and wages in the industry and present it in one place, which certainly has not been attempted before.

Unfortunately, no figures are available for Pollock's of Manchester, now the only firm still in production in Britain. No conclusions can be drawn from the prices at which their pipes are sold, for in 1968 one tobacconist in Bath was charging 1s for a Pollock cutty and 2s3d for a long Churchwarden while another in the same city was charging 2s3d for their cutty and 5s for the long Churchwarden.

Another tobacconist in Bath was selling cutties (with leaf decoration on either side of the bowl; make unknown) in 1968 at 10d each, representing a cost of 10s a dozen and a price comparable with the Pollock cutties sold at the less expensive of the other two shops noted above.

McDougall's of Glasgow were unable to give exact figures, as latterly their wages followed a makeshift pattern and were a compromise between piece- and time-rate depending on how much work had been done. Rates were frequently changed, not only because of inflation but also with the type of pipe made. Previously the trimmer received between a third and a half the wage of a moulder: ca.1948 the direct labour cost per gross of average pipes was ca.4s6d (which gives a rate of less than 1/2d a pipe) of which ca.3s3d went to the moulder and ca.1s3d to the trimmer. Had the same pay system been in operation in 1967, however, these costs would have almost trebled - i.e. a moulder would have been paid in the order of 9s a gross and a trimmer, 3s. The direct labour cost for an average pipe in 1967 would therefore have been ca.1d. McDougall's were unable to estimate how much it would have cost to take a pipe as far as the firing stage, but said it would have been less than the 2-1/2d quoted to the writer in 1968 by Southorn's of Broseley (Hemming *in litt.* 3 August 1968).

About 1958 Southorn's were paying their workers 2s6d an hour: direct comparison with the McDougall figures is difficult, but it is likely that the Southorn figure represents a lower wage, for those employed by that firm were all women - and were thus presumably paid less than men - and were employed on a part-time basis. A Southorn pipe was bought in Leicester in the early 1960s for 4-1/2d, at which price it must certainly have been a cutty (Daniell 1965: 62, presum. that shown in pl IV). Assuming Southorn's estimate of 2-1/2d to take a pipe (presumably a cutty) to the firing stage in 1968 was appreciably higher than the cost for the same work in the early 1960s, but allowing for firing and distribution costs to bring the early 1960s cost back to ca.2-1/2d, it would appear that there would be little profit to the maker by the time the retailer's cut was subtracted from the 4-1/2d. In 1961 it was observed (I. Knight 1961: 34) that clay pipes in Scotland, presumably cutties, were costing between 4d and 5d each, or 4s-5s a dozen, figures which could agree with the Leicester evidence for the cost of Broseley pipes. According to Knight, the price a hundred years earlier had been six for 1d (see below), or 2d a dozen, indicating a 48-fold increase in price over the period.

As noted in 2: VII when discussing the methods of packing clay pipes, the pipes were sold on the principle of caveat emptor, the dealer taking the loss of any broken merchandise. McDougall's delivered home sales by their own vans or carrier, but export sales were FOB a British port. Freight, even to places such as West Africa and Australia, was not a very large item, but various import duties or excise taxes could add 15-30% to the price. By the time freight charges, taxes, and allowances made by the North American dealer to cover losses by damage in transit - which could be very heavy, despite the care in packing - were added to the price of the pipe it would cost twice to three times as much in its country of sale as it would have in Britain (Rodger in litt. 17 January 1972).[1]

G.C. Spence (1942: 53-4), writing during the first half of WW II, noted that the shortage of brier had caused clay pipes to have a "limited revival", with cutties being sold for 2d-3d each and Churchwardens for up to 9d each.

In the 1930s Pollock's of Manchester's cheapest clay cost 2d (B. Rogers 1973: 26), and in Dundee in the early 1930s plain pipes were sold for 1d each and "glossy" ones for 2d each, representing retail prices of 1s and 2s a dozen respectively (D. Phillips 1970: 441-2). Just after WW I a pipe manufactured by White's of Glasgow could be bought in Glasgow for 1/2d (R.B. Wilkie in litt. 28 February 1967) which indicates a retail price of 6d a dozen. The Welsh firm of Pardoe at Nantgarw, near Cardiff, charged wholesale prices of between 2s6d and 4s a gross depending on the type of pipe (I.J. Williams 1932: 143) which gives prices of between 2-1/2d and 4d a dozen wholesale. This firm closed in 1920; the prices are probably from the period immediately preceding that date.

At the Portchester, Portsmouth, firm of Leigh and Co, which was founded in 1840 and continued until after WW II (C. Green 1973a), much of the work latterly was done by workers drifting from job to job taking what they could get (Triggs 1970; Chalkley 1955a: 5th page, quoting Portsmouth Evening News 3 March 1932, though Triggs's reference to them as "tramps or vagabonds" obscures the fact that they must have originally been journeymen pipemakers - happier days for workers at Leigh's factory, however, are suggested by a photograph, unfortunately undated but perhaps Edwardian, of the firm's dozen workmen posed with some of their tools, plus two dogs, in front of the factory (C. Green 1973a), for though all are in working clothes none is poorly dressed and some are relatively young). According to Triggs, the later workmen were paid 8d a gross of 16 dozen pipes. This indicates that they made 24 pipes for 1d, and assuming the average production when fully employed was three gross or a little more a worker might make 2s or slightly more per day or ca.12s a week. A wage well below what was being offered London pipemakers at the beginning of the C19 (see below). The

Macclesfield, Cheshire, firm of Turpin and Son (1840-1927) also gave employment to tramp workmen, who would work for a short while before moving on (G.C. Spence 1942: 56-7): this appears to have been a typical arrangement among pipemakers, for it is noted in Lincolnshire in the second half of last century, where as indicated below the journal of a pipemaker at that time recorded journeymen travelled from firm to firm and that if no work was available it was an unwritten law that the master gave him enough money or food to help him reach his next place of call (Hallgarth 1969: 34).

In Leicester early this century Flanagan's wholesale price for the expensive tripartite-moulded pipes was 6s6d a gross, the pipes being sold retail at 2-1/2d each. This latter price gives a figure per gross of £1 10s brought in by the retailer, or a profit of £1 3 6 which if correct sounds remarkably high. Unfortunately, Flanagan's profit in his price of 6s6d a gross is not stated - the price does indicate, however, that these pipes could be made for a cost (including an unknown amount of profit) of ca.1/2d each. Flanagan sold a gross of his cheapest pipes to publicans for 9d, and these were given free to customers at the taverns. Sixteen of these pipes thus cost 1d to produce, including again an unknown amount of profit (figures from Daniell 1965: 61-2). From the description of Flanagan's manufacturing process and the fact that he and his wife looked after the entire process from preparing the clay to distributing the pipes, it is difficult to believe that pipes could have been produced at a lower price unless a maker had a deposit of local clay immediately available.

The giving away of pipes in public houses appears to have been widespread latterly. Apart from the reference above to Flanagan's cheapest pipes being bought by publicans to be given to customers, G.C. Spence (1942: 60) notes the custom in Cheshire and George Ewart Evans twice refers to it, recording on one occasion (1960: 82, 1967 ed) an informant recalling that at about the beginning of this century in Suffolk pipes "cost a halfpenny; and they used to sell them, and even given them away, in the pubs" and on another occasion (1970: 264) one of the East Anglian farm-labourers who went to work in the maltings at Burton upon Trent recalling that he brought back to Suffolk at the end of his first season there (1901) 90 pipes with pub names on them which had been handed out free at the pubs in Burton (see p.230 above).

At about the same time, Rainford pipes, probably of the cutty type, were being sold (retail?) for 1-1/4d each (Berry 1963: 8). Elsewhere before WW I, possibly in London, pipes (which must have been cutties) could be bought for as little as 2d a dozen; wholesale their cost varied from 1s to 6s a gross according to size and quality (Anonymous 1921a). If 1s a gross represents the wholesale cost of cutties this indicates that the maker could still find a profit in wholesaling a dozen for 1d and that the retailer selling them at 2d a dozen was making 100% profit. Taking the whole sale price of 6s a gross for the most expensive pipes, these were still costing only 1/2d a pipe to make, including the maker's profit.

In December 1921, when the last Bristol pipemaking firm T. George and Co closed, there was a brief report in the local paper (Anonymous 1921b). No pipe prices are given, but amongst the reasons given for closure was the cost of clay - £3 5s a ton when it had formerly been 11s - and the cost of oil - seven times its former price. The date when these former prices held good is not given, but the impression given is that it was probably the turn of the century.

The booklet of prices effective autumn 1900 for almost 2,000 pipe types and styles made in Glasgow, Edinburgh, and Aberdeen (Anonymous 1900) lists prices per gross of from 7-1/4d to 9-1/2d with a few going up to 1s9d, but the majority of types were priced between 8d and 9d. One pipe produced by White's of Glasgow and known as an "Extra Show pipe" had "Time Wage" in the price column, presumably indicating that it had to be custom made (its name probably indicates an unusually elaborately moulded pipe). When ordinary moulds had to be altered to do work involving a "thick wire or poker" (for the use of the latter term in the Glasgow industry see 2: VII) 2d was added to the price of each gross, though how the mould was "altered" is not stated.

Prices, however, also varied depending on the type of clay used and on certain features added or modifications made. For example, it was stated (Anonymous 1900: 4) that all "Plugs" increased the cost of the pipe by 2d a gross and that inclusion of a "venting needle" as used on White's "absorbent heads" (cf Fleming 1923: 243) put the cost of a gross up by 6d. (What precisely these features were is uncertain - both suggest some sort of cleaning method.) Pipes made of red clay cost 1/2d a gross extra, those made of terra cotta 1d a gross extra, and those made of "prepared clay" 4d a gross extra for "straights" and 6d a gross extra for "bent bowls".[2] With the demise of the industry the meanings of many of these terms have been lost, but a manuscript note at the foot of the same page in the copy of the booklet in this writer's possession (original in the Huntly House Museum, Edinburgh) gives what appears to be definitions for the clay types. The red clay is described as "common (tile) clay"; the terra cotta as "Doulton's", presumably a reference to the Lambeth stoneware firm of that name originating in 1815 (R. Edwards 1973: 7) which still exists, though now at Stoke-on-Trent and specializing in bone china (information from Miss D.M. Griffiths, Research Division, National Historic Parks and Sites Branch, Ottawa); and the prepared clay - rather obscurely - as "mixed with etc".

These prices give costs of ca.3/4d for the ordinary range of pipes and up to 1-3/4d a dozen for more elaborate pipes and long-stemmed pipes such as White's and Davidson's 21-and 22-ins examples, prices which agree with other evidence for wholesale prices about this period. Interestingly, however, 1-3/4d a dozen for the 21-ins pipe is half the cost for the same type recorded earlier, in mid-century both in Glasgow and Edinburgh (see below). The price for the 16-ins White's pipe in 1900, 1s2d a gross or ca.1-1/4d a dozen, is also half what Glasgow pipes of this length cost ca.50 years previously (see below).

Elsewhere in the prefatory notes (p.3) there is one "that the new moulds presently [sic] in dispute...be paid at 8-1/2d per gross making", that no new pipes were to cost under 8d a gross, that "new carving or alteration in fillet" was not to effect prices, and that 8d pipes were to remain at their previous price. (The carving presumably refers to minor engraving changes on the mould; the fillet may have been the piece carrying the name of the maker and place of manufacture or the type-name of the pipe.) This agreement is a reference to a dispute at McDougall's, and has all the indictions of a compromise agreement. It also indicates, as does the sub-title of the booklet - Price List as agreed between the Employers and Employees... - that the employees had some say in fixing the prices, presumably because their wages, which would have been piece-rate, were a proportion of the selling price (for more details of this see Section II below).

In Wright's Bristol and Clifton Directory for 1892, by which time Bristol's clay pipe industry was almost dead, the firm of T.J. Corcoran ran an advertisement which listed "Irish, Straws and Meerschaum Patterns 1s6d per gross Assorted cutties 1s0d per gross." Straws refer to long-stemmed pipes (see Appendix II); Irish may refer to Dublin, Cork, and Limerick types of clay pipes, though all those seen by this writer have been short-stemmed which makes their inclusion among the more expensive types puzzling. "Meerschaum patterns" were undoubtedly elaborately-moulded pipes in ballclay or kaolin imitating meerschaum bowl styles, usually taking a stem of some material other than clay. The prices given indicate that expensive pipes at this date cost only 1-1/2d a dozen, and the cheap pipes 1d a dozen. For an extra 2d a gross, provided the order was for four gross or more, pipes could be "personalized" by having one's name and address stamped on them - a free sample would be sent on request. A rhyme current in St Jude's at the turn of last century referred to pubs selling a pipe for a farthing (see p.750 below): even at this rock-bottom price a dozen would have cost 3d, twice Corcoran's price for his quality products and thrice for his "Assorted cutties", suggesting a 200-300% mark-up even if the publican paid the additional 2d a gross for personalized pipes. (Two different examples of pipes stamped in this manner were found in the 1960s during the demolition of property in Lamb St, St Jude's, where Corcoran worked. These are noted in 2: VII.)

Penn, writing at the beginning of the C20 (1901: 151), says that pipes were cheap but that as recently as 1882 (in London?) pipes "moulded with figures" cost 6d each, which represents a price of 6s a dozen. These must have been elaborate and expensive pipes, similar to those noted below, for a source of the 1880s says that pipes were made so cheaply that the commoner kinds could be retailed with profit at 1/4d each (Enc. Brit. 9th ed 1875-89: XIX, 111) a price which represents 3d profit for a dozen.

Recently a journal of a pipemaker at Market Rasen, Lincolnshire, in the second half of last century has been found (Hallgarth 1969). Its author was George Spencer Watkinson jr who worked for his father and in 1885 took over the business, which had been founded in 1843. During the second half of the century the business expanded, taking over factories in Lincoln, Brigg, and Louth - these may well have been bankrupt small concerns, for a study of pipemaking in Lincolnshire (paper by P.K. Wells at the Spring Conference of the Society for Post-Medieval Archaeology, Lincoln, March 1969) indicates a pronounced drop in makers during the later 1850s and an even more pronounced one in the later 1860s, after which the industry steadily dwindled. An interesting comment on the journeyman-pipemaker who travelled from firm to firm is that if no work were available it was the unwritten law the master-pipemaker would give him enough money or food to help him reach his next place of call. Hallgarth mentions good journeymen-workers might earn 20s-24s a week, but unfortunately at this point has made an aside about other journeymen who tramped the C19 roads - tailors, shoemakers, and carpenters - and it is not clear whether these wages are specifically applicable to journeymen pipemakers.

Pay was by piece-rate. Watkinson snr paid his workers 1s6d a gross for the 24-ins Churchwarden, 1s a gross for an 18-ins pipe apparently called a common clay (generally, however, this term seems to be synonymous with cutty), 9d a gross for 10-ins pipes called dandies, and 7-1/2d a gross for a 4-1/2-ins cutty. Each gross was 16 dozen - 192. The girls doing the trimming received 1d-3d a gross depending on the size of the pipe.

The pipes were sold to country inns and grocers' shops - a charge of 1-1/2d a time was made at toll-bars for the horse and cart which took round the pipes, which were packed in straw in cases and barrels. Grocers sold them at costs varying from 2d or 3d each for Churchwardens to 1d for three or four cutties.

Taking a figure of about three gross, which seems to be an average daily production for a pipemaker (see below), and assuming this would apply to average-sized pipes, but probably not to the 24-ins types, a journeyman employed by Watkinson in, say, the third quarter of last century might earn ca.3s a day or ca.18s a six-day week, rather less than the 20s-24s noted previously.

In 1851 it is noted that Watkinson snr had "several" journeymen and two apprentices "living in". Assuming there were six journeymen each earning ca.£18s a week and that the apprentices were paid the equivalent of 10s each in board and possibly a small cash allowance, Watkinson's weekly outlay on wages might have been ca.£6 8s. If each journeyman made ca.3 gross pipes a day their weekly output would have been ca.108 gross; if the apprentices also made some the total output of the factory might have been ca.120 gross, though as no trimmers are mentioned the apprentices may have done this. Prices of pipes would obviously vary considerably between that of a cutty and that of a Churchwarden, but estimating an overall average wholesale price of 3d a dozen and reckoning on a gross by this time being 12 dozen then the week's output of ca.120 gross might realize ca.£18. If wages came to ca.£6 8s this would leave a total of ca.£11 12s a week to cover all other expenses - the clay (which was brought by water from Devon to Gainsborough and taken by cart, and later by rail, the last 20 miles to Market Rasen), the coal used as fuel, all the running expenses and equipment and distribution - and leave enough for the Watkinson family (with 14 children) to live on. The sum is probably adequate for the period.

A price-list of the products of Ebenezer Church of North St, Pentonville, London (see 4: VI), "corrected to May 1879" and in the possession of this writer indicates an extensive variety of pipes and cigar-holders, with widely-ranging prices. The cigar-holders all cost 6s a gross in their basic "polished" form; "plated rims" cost another 7s a gross extra, and "goose-bone stems" another 2s a gross extra. "Superior Clay Bowls (moveable stems)" all cost 15s a gross with goose bone stems except for the Clay Blocks model, which cost 20s a gross with "best long bones" stems; otherwise, best long bones, extra finish, and plated rims all cost extra. "Spécialité Clays" cost from 6s to 24s a gross depending on finish, mounting, and type of stem fitted. However, the normal run of traditional clays cost from 1s8d a gross for types such as the Scotch Cutty, through 1s10d and 2s for two types of Burns Cutty, 2s6d and 3s for most of the various "Irish Clays" (save for the Long Cork Irish at 5s a gross and the Heavy Cork Irish at 6s a gross, which was in fact the most expensive of all), 2s9d for 8-ins Broseley Straws and 10-ins Dutch Straws, 2s10d for 15-ins Parlor [sic] Pipes, 3s3d for 15-ins Hotel Straws, and 3s3d and 3s9d for two types of 15-ins Broseley Straws, with the 18-ins Masonic Alderman occupying pride of place among the long-stemmed pipes at 5s6d a gross. "Bent Clays. Carved or Plain" all cost 3s6d a gross.

These prices indicate that the cheapest pipes cost ca.1-3/4-2d a dozen, that rather more elaborate ones cost 2-1/2d-3-1/2d a dozen depending on their design, and that long-stemmed pipes varied from 2-3/4d to 5-1/2d a dozen depending on length and design. All these figures are much higher than those noted above for Bristol pipes in 1892 and Scottish pipes in 1900, suggesting that as late as 1879 Church was still catering for middle-class patrons.

An 1875 catalogue of a large London general store, R. Hovenden and Sons, listed clay pipes over a wide range of prices depending on style and quality (Anonymous 1875: 111). One-gross wooden boxes of assorted pipes came in a whole range of prices from 2s6d to 8s; 4-ins Dutch straws were 2s9d a gross; 5-, 6-, and 9-ins London straws cost 3s a gross and 16-ins London straws 4s6d (to have a gross of the latter in "card" boxes of a dozen each cost 7s6d which gives an idea of the cost of packaging); while "Fancy Clay Pipes, With Glass Eyes" listed as elephant, horse's head, ram's head, and donkey's head all cost 6s6d a gross. "Mounted Clays, Superior Colouring" cost 2s3d per dozen, silver and amber ones in cases costing 18s a dozen. The cheaper mounted pipes were therefore presumably mounted with horn, the normal mouthpiece for brier pipes before vulcanite was invented. On these prices, therefore, which are presumably retail, clay pipes cost 2-1/2d to 8d a dozen, medium-length ones costing 3d a dozen, 16-ins ones 4-1/2d, and "fancy" ones 6-1/2d.

Ledger entries and bills from the Angel Hotel, Abergavenny, now in the Abergavenny and District Museum, give costs for Broseley pipes supplied between the 1850s and 1870s by the firms of William Southorn and Edwin Southorn (FIG 141 shows a bill from William Southorn and Co; I am extremely grateful to the Curator of the Abergavenny and District Museum, D.W.D. Thacker, for giving me the original of this).

Ledger amounts and prices (there are a number of "To Goods" entries which give a price but not the amount of the pipes ordered) are as follows - all are for pipes bought from William Southorn:

30 August 1865	15 gross pipes	£3 10 6
31 December 1866	20 gross pipes " @ 4/6"	£4 13 0
3 December 1867	20 gross pipes " @ 4/6"	£4 12 6
21 September 1868	12 gross pipes "Box 2/6 4/6"	£4 12 6
13 July (no year given)	"12 Gross best Broseley pipes sent without order & much broken Box 2/6 4/6"	£2 16 6
21 January 1871	"10 Gross B s Pips 6/- Box 3/-"	£3 3 0
2 December 1872	"8 Gro B Smoke Rooms 4/6 & Box 2/-"	£1 18 0

The bill from the same firm mentioned above and illustrated in FIG 141 appears to be for the last above-noted item together with a subsequent "To Goods"; a bill from Edwin Southorn dated 30 November 1874 is for "12 gross

Best P. Tipt" at 4s9d a gross plus the cost of the box, a total of £3 1 0.

These prices indicate that Broseley pipes, probably long-stemmed - the "Broseley Smoke Room" referred to in the 2 December 1872 ledger entry was a pipe 20 ins long according to a Southorn chart showing their various products which is in the possession of this writer - consistently cost 4s6d a gross, a price which gives a cost of 4-1/2d per dozen. The "B s Pips" noted costing 6s a gross - 6d a dozen - in the 21 January 1871 entry are probably a longer-stemmed type, of which the Southorn chart illustrates three, of 21 ins, 27 ins, and 28 ins length, though none can be identified with the cryptic wording of the ledger entry. (If "B s Pips" were to refer to Broseley Smoke Rooms then the 4s6d version noted 2 December 1872 might in fact have been the Short Broseley Smoke Rooms, a version with a 16-ins stem, 2 ins shorter than the Broseley Smoke Room.) Edwin Southorn's "Best P. Tipt" must refer to pipes with lacquered or otherwise treated mouthpieces. According to Jewitt (1878: I, 298) Edwin Southorn's fame included his use of glazed mouthpieces, but tipping of pipestems in wax or glaze was certainly known long before Southorn's time (2: VII and Appendix IV); Southorn may, however, have used a characteristic form of tipping. (The gross prices listed probably all include the cost of the box, even when this is not specifically stated. For example, the 31 December 1866 entry of 20 gross at 4s6d a gross would come to £4 10 0, which suggests the additional 3s represented in the stated total must have been for a box. If the price per gross for the order of 30 August 1865 was 4s6d then the calculations here too would have to include 3s for the box. An example of Southorn pipes in an original box is at the Welsh Folk Museum, St Fagans, Cardiff; it is a large flat box similar to a tie-box but much larger, though for shipping by the gross some larger and much stronger container must have been used. Possibly boxes such as that at St Fagans were put in packing-cases full of chaff or sawdust or some other padding.)

Broseley, at least specifically Southorn, pipes last century were accounted the best in Britain, a reputation which from specimens seen by this writer was merited so far as their manufacturing quality was concerned and which had the specific seal of approval set by the pronouncement (quoted on the letter-head of Edwin Southorn's bill) that "The best pipe is unquestionably the 'Churchwarden' or long clay" by a Dr Richardson at the Bath meeting of the British Association in 1864 (cf Jewitt 1878: I, 298). (It should be noted that the term Churchwarden appears to have initially been associated with a Southorn product and may indeed have been invented by a member of the family (see Appendix II).) It appears, therefore, that premier-quality Broseley pipes were costing 4-1/2d-6d a dozen for long-stemmed examples in the 1850s to 1870s. Presumably cutty-sized Southorn pipes were in the 2d-3d a dozen range and the very longest pipes - the Wm Southorn and Co illustrated chart shows one, a "Long Dutch Straw", 28 ins long - possibly 6d-7d a dozen. Such figures seem comparable to those from Hovenden's 1875 catalogue quoted above and somewhat more than roughly-comparable pipes being produced in Glasgow (see below), which were certainly outselling English pipes abroad at that time.

The Angel Hotel's ledger-books show that the then owner, R. Morgan, was also buying pipes from at least two other sources during this period. In the 1860s he bought from Richard Spooner of the Cambrian Pipe Factory, Tredegar, ca.10 miles WSW of Abergavenny; and in the 1850s and 1860s he was buying from the Bristol firm of Ring. The Spooner entries give the prices paid but unfortunately not the amount of pipes bought, the entry merely reading "To Pipes", but a number of the Ring purchases are given in detail as follows:

20 March 1860	23 gross 19-ins "Straws Glazed Pipes" at 3s a gross, with two boxes costing 8s	£3 17 0
4 June 1862	12 gross 19-ins "Broseleys" and box costing 4s	£2 0 0
7 July 1863	13 gross 19-ins "Broseleys" and box (price not stated)	£2 9 6
8 March 1864	"Do" and four boxes (price not stated)	£2 12 0
9 June 1864	"Do" and box costing 4s	£1 19 0

From the first two entries it appears that 19-ins pipes from Ring were costing 3s a gross, or 3d a dozen, a price somewhat lower than that for similar Southorn products. The third entry suggests, if one assumes the box referred to cost the same - 4s - as the previous year, that the price of Ring's 19-ins "Broseleys" had gone up 1/2d a dozen since the preceding purchase 13 months earlier. The next entry, however, suggests the cost may have gone down to just over 2-3/4d a dozen, for if the four boxes noted here but not priced cost 4s each as elsewhere the 13 dozen pipes would have cost £1 16s. The next entry, dating to only three months later indicates a further if slight drop, 13 gross now costing 35s or fractionally under 2-3/4d a dozen. A subsequent entry dated 21 June 1866 where an unspecified number of pipes and two boxes each costing 2s came to a total of £2 3 0 suggests the cost may have returned to 3s a gross (3d a dozen) - if 13 gross were bought on this occasion as earlier 3s a gross would give a total cost of £1 19 0, the ledger total minus the cost of the boxes.

It might be expected that products lacking the fame of those of Southorn would cost less than the latter - the use of the term "Broseleys" by Ring's as early as 1862 suggests the desire to plagiarize products of that centre - but it is perhaps surprising that the average of 3d a dozen for 19-ins pipes should be so close to the mid-century Scottish prices of 2d for cutties, 2-1/2d for 16-ins, and 3-1/2d for 21-ins pipes when it appears Scottish pipes were outselling English pipes so markedly in North America. Ring, however, is one of the relatively few C19 English makers whose pipes have been found in North America, though finds of Ring pipes there are not common (see 6: VII(b)). Ring's prices in the 1860s may have been lower than earlier, however, for the period 1861-67 as noted later (6: VI and passim) saw the sudden final collapse of the Bristol industry and this may have occasioned a lowering of prices in Bristol as firms there fought for survival. Certainly by the 1890s (see above) long-stemmed pipes made in Bristol were costing half of the prices listed here.

In the middle of the C19 Mayhew (1861-62: I, 440, 1968 ed) records that porcelain pipes, or at least porcelain pipe bowls, were sold for 6d each, the street pedlars obtaining them at 4s a dozen wholesale. "Comic head" clay pipes were usually sold for 2d each and obtained for 1s4d a dozen or 15s a gross wholesale. Mayhew continues:

> There are now nine men selling pipes,^{3} which they frequently raffle at the public-houses; it is not unusual for four persons to raffle at 1/2d. each, for a "comic head." The most costly pipes are not now offered in the streets, but a few are sold on race-courses. I am informed that none of the pipe-sellers depend [sic] entirely upon their traffic in those wares, but occasionally sell (or raffle) such things as china ornaments or table covers, or tobacco or snuff boxes. If, therefore, we calculate that four persons^3 sell pipes daily the year through, taking each 25s. (and clearing 10s.), we find 260l. yearly expended upon the hawkers' pipes.

With a wholesale price of 15s a gross (above) this indicates a hawker sold ca.240 pipes a day, a figure which illustrate the short life these items had.

As these "comic head" pipes were often works of considerable artistry (e.g. Fresco-Corbu 1445-6; 1967: 1474 and 1477) plain clays - not noted by Mayhew but see below - must have been very much cheaper, particularly as at least some of the "comic heads" were imported from France. Presumably the supplier of pipes wholesale was a middleman, which indicates that the final selling price covered profit by maker, middleman, and vendor, the last-named making 2s in a dozen on "china-bowls" and 8d in the dozen on "comic heads". As the middleman was selling the latter type at between 1-1/4d and 1-1/2d each he must have been buying them for not much more than 1/2d each, a price which was still profitable for the manufacturer.

Fairholt (1859: 179n.) describes a situation very similar to that described by Mayhew, and gives a wholesale price for what seem to be cheap pipes of 1s4d a gross and a retail price of four for 1d. These figures indicate that a dozen cheap pipes - presumably cheap cutties - could be sold by the manufacturer for just over 1-1/4d and still produce a profit. Retail, a dozen of these pipes would have cost 3d, which indicates a vendor's profit of just over 1-1/2d a dozen or just over 100%. However, the street-vendors who sold these pipes (Anonymous 1856a: 92-3, repeated in Fairholt 1859: 178-9) presumably did not obtain their pipes directly from the manufacturer, but as in the case of Mayhew's vendors, through a middleman, who no doubt took the lion's share of the profit noted above. The fact that by the time Flanagan was working in Leicester the cheapest pipes were being sold to publicans who gave them free to customers suggests that before 1900 it had become impractical to retail these pipes - indeed the reason Mayhew's vendors apparently sold only the more expensive pipes may have been for this reason, in which case the anonymous 1856 reference to hawking cheap pipes may refer to a period some time before 1856. (The remarks on hawking pipes, obviously a very common practice in the mid-C19, are interesting (cf 2: VII), for among the new by-laws of the London pipemakers' guild dated 23 January 1805 was one forbidding members to hawk or to allow their products to be hawked: 10s was the fine for the first offence, 20s for the second, and 40s for the third (quoted in Robinson and Spence 1937: 208).) The price per dozen for these cheapest pipes is comparable with that for single "comic heads" pipes given by Mayhew, suggesting the latter were 12 times as expensive to produce as the cheap pipes, a figure which may be broadly accurate.

Fairholt also depicts (1859: 189) a pipe made in the shape of a broom by a French manufacturer and apparently of a most superior type, which was being sold in England for 6d. In view of the number of middlemen these pipes must have passed through, and probable import duties in addition, it is clear that even elaborate pipes could be produced quite cheaply, though in this case it is possible production costs in France were much lower than in England. According to the anonymous observer noted above (Anonymous 1856a, quoted in Fairholt 1859: 178) a pipemaker's business "when trade is prosperous and the demand brisk" made about 45 gross pipes a day "which gives an average of nearly five hundred pipes per diem for each of the hands employed" (this was in East London "in a back-lane in a turning out of a street running from Whitechapel Road"). Assuming the gross referred to was 180, ca.8,100 pipes were made a day (or ca.6,500 if the conventional gross is meant). If the average production was nearly 500 pipes per man then the factory had ca.14-17 workers, though whether the latter figure excludes the non-moulding workers - trimmers, packers, etc - is not clear. The type of pipe being made is not stated, but applying Fairholt's wholesale price of 1s4d a gross (which admittedly does not come from the same source as his production figures) to the daily output of ca.45 gross would indicate a daily income of ca.£3 or ca.£18 weekly, the same figure arrived at for Watkinson's factory at Market Rasen at about the same time. However, Watkinson was estimated to have had only 6 journeymen and 2 apprentices - 14 to 17 men paid out of a weekly £18 income must have been paid ca.10s, almost half what Watkinson's journeymen earned but more than double the pay in Bristol in mid-century (see below).

What evidence there is available for daily production suggests ca.500 pipes per person is a reasonable estimate. Pollock's estimated three gross or a little more for the production of short pipes (that is, covering the whole sequence from rolling to trimming).

When the last Bristol pipemaking firm, George's, closed in 1921 they had employed for their last two years three pipemakers who produced an average of 50 gross a week (Anonymous 1921a). Assuming a six-day week this gives a daily average per pipemaker of ca.2-3/4 gross - somewhat less than that at Pollock's but probably compatible with declining sales at that time which had left George's with nine months' stock on hand. (A five-day week would give a daily production rate of 3-1/3 gross.) Throughout the 1950s and the mid-1960s until the final run-down of the firm towards its closure in 1967 McDougall's were producing 60 gross pipes a week (Walker and Walker 1969: 145-6) though the number of workers is not noted - there were two immediately prior to the firm's closing. In 1954, immediately before White's of Glasgow closed, they were said in a newspaper account (Anonymous 1954b) to be still producing 100 gross a day, but this is certainly impossible - 100 gross a week may have been meant, though an account of White's appearing about the same time (Samson 1954: 10) implied White's had then only two moulders, and they would have to produce 10 gross each a day during a five-day week to make 100 gross in a week, a figure which is almost impossibly high (see below).

E.H. Knight (1876: 2584) claims that one worker could produce four-and-a-half gross a day, but figures which can be deduced from wages paid in London at the end of the C18 and the beginning of the C19 (discussed below) indicate three gross was an average figure. Ure (1848 ed) says that a man and a boy could easily make five gross a day - the boy making the rolls (in this case said to comprise separate pieces for stem and bowl - see 2: VII) which would give an average of two-and-a-half gross per person. Hughes (1961b: 1634), who is admittedly not a reliable source, says a skilled worker could produce 20 gross in a 65-hour week, the workday being just over 10-1/2 hours. This implies a six-day week and thus a daily production of two-and-two-thirds gross.

Hallgarth's figure of 12 gross a day (1969: 34) "if the orders justified it" seems unbelievably high, for even with a gross of 144 this would come to over 1,700 pipes a day, and even working a 12-hour day this would mean a gross an hour or between two and three a minute non-stop. Weld however (notes 1832: 513), notes that the rate for moulding alone at Knockcrogherty in west-central Ireland (see 2: VII) was "seven or eight groce" in a day "during the ordinary hours of working; but more might be done with exertion". A retired pipemaker with the firm of Pardoe at Nantgarw near Cardiff which closed in 1920 is recorded ca.1930 as saying (I.J. Williams 1932: 142) that with his wife and daughter assisting in cleaning the moulds and trimming the pipes his output was 60 gross of 168 (14 dozen) each in a week. Assuming a six-day week this would give a figure of ten gross a day - more if a five-and-a-half day week was worked - which is not far from Hallgarth's figure, but Williams's account of Nantgarw pipemaking does not seem to be accurate in some other aspects (see 2: VII), and this writer does not feel happy about accepting either his figures or those of Hallgarth. In any case, the involvement of two other people at Nantgarw argues for the figure there to be divided by three; possibly this should apply to other figures also. That a rate of two to three moulded pipes a minute could be kept up for an entire day, and for day after day, is difficult to accept, but perhaps only so to a person brought up on eight-hour, five-day weeks with unionized breaks and other modern working conditions.

One point that is not clear is whether the rolling and moulding processes were normally done by the same worker last century, as certainly is the case in the restricted industry of today. The figure of ca.3 gross probably refers only to finished pipes per day, as indeed Pollock's figure and other evidence indicate, so that rolling and moulding (i.e. with the trimming excluded) would have been a higher figure. Chalkley (1955b: 8) claimed the standard production-rate for a skilled moulder was one gross of 150 an hour. One is reluctant to accept most of Chalkley's statements without other evidence to back them, but this rate would allow figures last century of 8-10 gross a day for moulding only, and it may be that the apparent discrepancies between figures of ca.3 gross a day and those of 8-12 gross are caused by confusion between the number simply moulded and the number finished as far as the stoving process. Support for this conclusion comes from figures, if not for current production at Courtrai in Belgium then for production there in the fairly recent past (see 2: III), where it is stated (Van Hooneker 1971: 244) that in an eight-hour day six gross each of 180 pipes could be made by the rollers and the moulders and six to seven gross could be finished each day by the trimmers. As in effect the same pipes are being passed from stage to stage in this process (i.e. from roller to moulder to trimmer), the total production of finished pipes is six gross divided by three, the number of stages a pipe passed through, so that actually two gross pipes were finished each day. As the European method of manufacture differs from the British in, among other aspects, having a less easily manipulated tool to form the bowl and in using a more elaborate trimming process, a figure of somewhat less than the British three or so gross finished pipes a day would not be unreasonable. Even so, a rate of two to three moulded pipes a minute kept up for hours on end (and this would include the wiring) sounds formidable.

Apperson (1914: 162-4, quoting from N&Q 27 September 1913) notes that pipes sold by Milo, a tobacconist in the Strand, and Inderwick, a tobacconist near Leicester Square, were famous in the 1850s (cf 2: VII). It is implied that these firms actually made their own pipes, and at least in the case of Inderwick's this may have been true. This firm, founded in 1797, still exists (now in Carnaby St but formerly at Whitcombe St, Leicester Square), and certainly made its own meerschaums in which it specialized (see 1: VII(d)). Whether clays were actually made by the firm, however, is uncertain (Inderwick and Co Ltd in litt. 26 February 1969) - it is possible that clays were made for them and stamped with their name after the manner advertised by T.J. Corcoran of Bristol in 1892 and noted above. These pipes were sold for 6d each and Inderwick's were compared to those of Fiolet of Saint-Omer, which suggests, as do the prices, that these were high-quality pipes. Even the Milo cutty, however, appears to have been a well-considered pipe (Apperson 1914: 163-4).

In 1850 in Bristol, when the C19 pipemaking industry there appears to have been about at its height, a woman making pipes in her home up to but excluding the firing stage, apparently for one of the local St Jude's firms, was paid 3s for nine gross of 180 pipes each, out of which 5-1/2d went to the man who prepared the clay for her (anonymous correspondent to the Examiner 17 August 1850). This interesting first-hand account of a pipemaker's existence in the St Jude's slums in the middle of last century is discussed in more detail in Section II below and in 6: VIII, but the figures given indicate a dozen pipes cost 1/3d. To this has to be added the cost of the clay - presumably this was supplied the woman by the firm to whom she sold her pipes - the firing, and the packing, besides the firm's profit and that of a retailer (if indeed the firm did not market its products directly through its own staff): as 19-ins good-quality Bristol pipes were costing 2-3/4d-3-1/2d a dozen in the 1860s (see above), the total production cost of pipes sans profit in Bristol at this time was probably ca.1d a dozen.

In 1840 Thomas Carlyle (1795-1881) ordered the "best, and largest" pipes from the Edinburgh maker Thomas White at 3s6d a gross (Fleming 1923: 244, quoting a copy of Carlyle's letter to a friend requesting him to buy the pipes).[4] On another occasion and at an unspecified date, but probably in the middle or later part of the century, Carlyle ordered 21-inch long pipes from McDougall's which cost 3s6d a gross and refused to accept 16-ins pipes sent him for 1s a gross less because he insisted on the longer stem (recounted by a McDougall worker in Fleming 1923: 246-7). As the same source says that Carlyle would not take English long pipes at any price because they had a curved stem it is clear that Carlyle was extremely fussy as to his pipes, and this and the similar cost quoted suggests that White's "best, and largest" were 21-ins pipes like McDougall's. These costs - 3-1/2d a dozen for 21-ins pipes and 2d a dozen for 16-ins pipes - compare closely to the 2-1/2d-3d a dozen for Ring's 19-ins pipes of ca.25 years later but are lower than the 4-1/2d and more a dozen for the exclusive Southorn products of comparable size also ca.25 years later. Presumably Glasgow pipes captured the C19 market in North America by virtue of superior quality compared to similarly-priced English material, though they may also have had superior marketing (cf 4: IV). The mid-C19 Glasgow figures would broadly agree with I. Knight's statement (1961: 34) that "A hundred years ago" pipes in Glasgow were six for 1d - 2d a dozen - compared to their 1961 price of 4d or 5d each; both sets of prices are presumably for cutties.

Poorly-made pipes in Co. Roscommon, Ireland, were being sold (wholesale to pedlars) at "only" 1s a gross of 12 dozen in 1832, though some time previously they had been sold at 2s6d a gross (Weld 1832: 511). These prices represent 1d and 2-1/2d a dozen wholesale respectively, which from Weld's remarks must have been cheap compared with the prices for better pipes from better production centres.

An Invoice Book of the Poole firm of Slade and Sons, now in the Provincial Archives at St John's, Newfoundland, notes among the goods aboard the "Fame" sailing for Fogo, Newfoundland, two barrels of pipes totalling 36 gross and costing 2s6d a gross - 2-1/2d a dozen. (The pipes were products of William Dowdall, who is noted working in Poole by 1823 - the 1841 census returns give his age then as 60, indicating he must have been born ca.1781, and notes he was a native of Dorset - and whose presumed son, another William Dowdall, is recorded working in Poole as late as 1880 (Cooksey MS 1).)

In 1820 the North-West Company, which merged with its rival the Hudson's Bay Company the following year, obtained for its Canadian trade 30 gross pipes from Samuel Greenland and Thomas Duggan jr for £4 16 8 (P. Miquelon 1971: 96), which works out to a fraction under 3s3d a gross or ca.3-1/4d a dozen. (Duggan was also supplying the Hudson's Bay Company with pipes at this time (Krause 1969-70).) Pipes supplied to the Montreal fur traders during the period 1760-1821 were consistently called "Hunter's pipes"; these could apparently come in varying bowl sizes, for small bowls are repeatedly requested and on one occasion there is a specific request that the next shipment have smaller bowls than the previous (perhaps because tobacco was too expensive to smoke in large amounts). Presumably they were fairly short-stemmed and run-of-the-mill pipes, for there are occasional references to long-stemmed - 15 ins and 18 ins - and "long glazed" pipes (P. Miquelon 1971: 95-6).[5] As noted in 2:VII, glazed pipes could refer either to one with a polished or stroke-burnished surface or to one with a glazed mouthpiece; in either case they would be more expensive than the average cutty pipe even if they were not long-stemmed as they appear to have been here.

Bloice (in Atkinson and Oswald 1969: 219) notes Duggan working from 1823 to 1828, but Krause (loc. cit.) notes he, or perhaps a father and son combination, was supplying pipes to the Hudson's Bay Company from 1807 until 1830 and again (in conjunction with John Ford) in 1832; a Thomas Duggan was a Warden of the London and Westminster Tobacco-Pipe Makers' Guild in 1821 (Robinson and Spence 1937: 203 - this part of the text has been misplaced and should be on p.208) and was still alive in 1828 but dead by 1844 (Robinson and Spence 1937: 210, cf Woodman in Atkinson and Oswald 1969: 176). A Samuel Greenland is not recorded by Bloice, but a Sarah Greensland (sic), 1805-20, is noted and a W. Greenland, 1800-17, both in the same Smithfields area of East London as Duggan; while a George Greenland is noted in 1832 on the south side of the Thames in Bermondsey (Bloice op. cit. 220). It can be taken for granted, therefore, that the pipes supplied the North-West Company were London made and that their prices would reflect London prices.

As noted in the footnote on p.407 above, a group of Bristol pipemakers in 1812 were advertising two types of pipe, one of them with an obscured name beginning "Ne..." and the other listed as "Hunters Ditto", at 1s6d and 1s4d a gross respectively, with a 10% discount allowed for cash (advertisement among the pages of the Bristol Pipemakers' Guild Book). These prices work out at 1-1/2d a dozen and ca.1-1/4d a dozen respectively, figures which are much lower than others of this period for which there is evidence - for example, London prices for presumably average pipes during the period 1809 to at least 1818 were 3-1/2d-4d a dozen (see below) and as noted above the North-West Company was paying ca.3-1/4d a dozen for London pipes in 1820. Indeed, if these latter pipes were in fact Hunter pipes then this style, however many varieties there may have been, was costing well under half its Bristol price in 1812. That Bristol prices were lower than those of London is also suggested by comparison of Bristol prices recorded in an advertisement of 1799 (see below) and London prices of about the same date (see below): it is implied the latter were ca.2-1/2d a dozen, and while this may in fact have been higher than the actual price (for reasons see below) what were clearly the average Bristol prices varied from 1s to 1s4d a dozen for "short" pipes of the type apparently typically used for export while "common long" pipes cost ca.1-3/4d a dozen. Only the obviously prestige "long" pipes cost as high as and higher than the London figures, ranging from 2-1/2d to 4-1/2d a dozen unglazed and from 3d to 5d a dozen glazed. It is clear that the average Bristol pipes in 1799 cost 1d-ca.1-3/4d a dozen, so the 1812 prices of ca.1-1/4d-1-1/2d a dozen in all probability also indicate similarly average prices.

According to Berry (1963: 6), when the Rainford industry was at its height during the period 1800-40, men could earn between 14s6d and 24s a week depending on their skill and exertion - they were paid piece-rate - while women (presumably employed as trimmers) were paid ca.7s a week. Unfortunately, there appears to be some confusion here, for Chandler (1957: 340) quotes exactly the same figures for wages in the pipemaking industry in Liverpool in 1796. Both writers also quote that pipes were sold for 25s6d the gross. As the original source for these figures is not given in either case it is not certain to which place these figures refer, but it is perhaps more likely that it is to Liverpool - if, as it appears to be, it is manuscript source cited in Oswald 1970b: 230 and n.3, cf 228 n.6, then it is indeed Liverpool.

However, there is an additional problem involved with these figures, for the price quoted per gross - 25s6d - gives a cost per dozen of 2s1-1/2d, which seems incredible when compared to detailed figures available for the early 1800s in London. In 1819 the Journeymen Tobacco Pipe Makers of London published a grievance concerning their wages over the preceeding ten years in which they gave both their earnings at various dates and the prices at which pipes were sold by their masters (the Gorgon no 38, 6 February 1819: 302-4; cf no 44, 20 March 1819, 349). In 1809, after a stoppage of 15 weeks over demands for higher pay (the wording suggests a lock-out but it was probably a strike) a wage-increase of 4d a gross resulted in the Masters' increasing the wholesale cost of their pipes from 2s a gross to 3s6d and in some cases as high as 4s a gross. These prices continued to be standard until the time of writing, though the wages had been steadily reduced over the period 1815-18. The wages quoted for 1809 were ca.21s a week before the strike, ca.27s a week after it.

It is thus likely that the 1790s London pipemakers were earning a little less on the average than were Liverpool pipemakers, but it is inconceivable that Liverpool pipes could have been sold for 25s6d a gross while those in London were selling for 2s a gross - this would mean the former were making approximately 12 times the profit of London makers. It seems likely that the figure quoted by Chandler and Berry should be not 2s1-1/2d a dozen (which is what 25s6d a gross comes to) but 2s1-1/2d a gross. This figure would be compatible with the London prices. This would be in agreement with a reference to the Hudson's Bay Company selling pipes - source not stated, but Hudson Bay Company records indicate a London supplier at this time[6] - to its employees at 4d a dozen in 1782 (Nicks 1969: 117 citing HBC Archives E/2/13, Reel 4M3), for one might expect the company to make about a hundred per cent profit. Possibly 25s6d was the price for 12 gross. Assuming a cost of ca.2s a gross for pipes at this time, it is interesting to compare this figure for some available for pottery in Staffordshire in 1770 cited by Shaw (1829: 207-8, 1970 ed). Two shillings would buy a 20-ins dish, an 8-ins nappy or baking dish, the smallest of three sizes of tureen, and the second largest of five sizes of sauce-boats; London-size cups and saucers cost 1s (presumably the pair) and Irish-size 1s2d, while "Inlett" Teapots cost 2s6d (all these prices were for best quality; seconds cost about a quarter less and what were disarmingly called "worser seconds" were priced at half the cost of bests).

The figures from the Gorgon as to wages and prices are as follows:

Wages		
ca.1799	ca.18s	ca.2s6d a gross(?)
1809, pre-strike:	ca.21s	ca.2s6d a gross
1809, post-strike:	ca.27s	3s6d-4s a gross
1815	ca.24s	3s6d-4s a gross
six months later (still 1815?)	ca.21s	3s6d-4s a gross
another six months later (1816)	ca.18s	3s6d-4s a gross
proposed wage 1818 (resulted in second strike)	ca.15s	3s6d-4s a gross

On each occasion the 3s drop represented a reduction in wages of 2d per gross of pipes made, and the 6s increase in 1809 represented an increase of

4d a gross. Thus, assuming a six-day week, the average pipemaker made three gross pipes a day, a figure which seems reasonable in the light of other evidence available. From this it can be seen that in the 1790s London pipemakers were earning a little less on the average than those in Liverpool, and that they had received at least one increase (probably one of 3s) between ca.1799 and their successful strike in 1809. (This is not noted by the journeymen in their petition, and there is probably some inaccuracy in the prices they quote for this time, for the same price - ca.2s6d a gross - appears to apply before and after this unmentioned raise. The journeymen do not fail to point out, however, that their 1809 increase added only 4d to the price of a gross while the Makers took the opportunity to put up the wholesale price by 1s-1s6d.)

By February 1819 the London journeymen's strike had lasted 11 weeks, but a friend had procured them a factory, and by a week later (op. cit. no 39, 13 February 1819: 312) they were producing their own pipes in The Maze, Borough (Southwark). Significantly, the slums of the Borough were regarded by early and mid-Victorians as among those representing working-class London at its worst, before the East End came to be considered archetypal of London slums in the later C19 (Keating 1973: 586).

A 1799 advertisement among the pages of the Bristol Pipemakers' Guild Book of a group of Bristol pipemakers - Anna Viner, John Carey, Joseph Edwards jr, and Samuel Richards jr - gives considerable detail on pipe prices in Bristol at this date. The advertisement, directed at "Merchants, Captains of Ships, and Others", give the following prices:

"long tobacco pipes" - 3s, 3s6d, and 5s a gross "Glazed" and
    2s6d, 3s, and 4s6d a gross "Not glazed";
"common long tobacco pipes" - 1s8d a gross;
"short tobacco pipes, syitable [sic] for the different
    West-Africa markets" - 1s4d and 1s2d a gross;
"short tobacco pipes, suitable for the different American
    markets" - 1s4d, 1s3d, 1s2d, and 1s a gross;
"short tobacco pipes, suitable for the Irish and Spanish
    markets" - 1s3d, 1s2d, and 1s a gross.

From this it seems clear there were certain types traditionally associated with the various oversea markets, all of them short-stemmed pipes, while long-stemmed pipes it was implied were basically for the home market. To judge by the prices for the "long tobacco pipes" these were prestige products, well above the "common long tobacco pipes" in quality. Unfortunately, the London price of ca.2s6d a gross noted above for ca.1799 is not for any specified class of pipe and in fact the price at this time may have been lower (see above), which makes a comparison between London and Bristol prices at this time difficult; but even if the price at this time was ca.2s a gross, and assuming it was for average types of pipes in London, then Bristol figures still indicate lower prices there, for it is clear the "average" pipes in Bristol at this time were the "short" pipes ranging from 1s to 1s4d a gross and the "long common" pipes at 1s8d a gross, and that the "long" pipes costing 2s6d-5s a gross depending on type and whether they were glazed were of a superior class.

In G. Kearsley's Table of Trades (1786), an alphabetical list of trades with some details on them, the following information is given under Tobacco Pipe Maker. An apprentice's fee was from £5 to £10, a journeyman was paid 10s-14s a week without board or £12-£15 a year with board, and £20-£30 was required to set up business. Unfortunately, Kearsley is based on J. Collyer's The Parents' and Guardians' Directory and the Youths' Guide in the Choice of a Profession or Trade (1761), and according to George (1925: 360 n.8, 1966 ed) several entries in Kearsley do not appear to have fully incorporated wage increases since 1761. George also notes that both these works deal mainly with trades in Middlesex, Westminster, and the out-parishes - where, as noted in 4: VI, the majority of the pipemakers appear to have worked - and not with the City trades. An earlier work, Campbell's The London Tradesman... (1747, republished 1969) also deals with trades outside the City, and according to George this forms the basis of Collyer and therefore indirectly for Kearsley. Unfortunately, it has not been possible to consult a copy of Collyer, but Campbell, talking of pipemakers, says (1747: 337, 326, 1969 ed) apprentices' fees ranged from nothing to £5, that hours of work were from 5 a.m. to 8 p.m., that a journeyman earned 10s-15s a week "the few that are of them constantly employed", and that £20 to £50 was needed to set up as a master. These figures do not differ enough from those quoted by Kearsley to suggest that Collyer or Kearsley had updated Campbell's information.

In the same year, 1747, as Campbell published his work there appeared Waller's A General Description of all Trades... dealing with City trades. This source, while giving slightly differing figures in its entry on pipemaking , provides similar information to that given above. Apprenticeship cost £5 though sometimes there was no fee, the hours were 5 a.m. to 8 p.m., a journeyman could earn 10s-21s a week, and to set up as a master £20-£30 was needed (cf Oswald 1970b: 230). The ca.18s a week noted earlier as being a journeyman's wages ca.1799 suggests that Kearsley's 10s-14s refers to an earlier time than 1786 - probably to mid-century, if Campbell's figures are up-to-date. In any event, the comparison of these figures with that of ca.18s for the very end of the C18 indicates that pipemakers' wages increased during the second half of the century, despite the general decline in the market for clay pipes during this time as noted elsewhere from a number of sources. However, as Campbell notes, few journeymen were constantly employed and the work was "but moderately profitable." An increase of the amount indicated is likely to have kept wages in general step with the rise in the cost of living in London after 1750 (discussed later).

Regarding the difference between wholesale and retail prices, this cannot really have occurred until factories, as opposed to home industry businesses, became common, which on previous evidence would probably be towards the end of the C18. Prior to this the pipemaker probably sold either directly from his premises or had a pipe round (cf Mitchell and Leys 1958: 209, 1963 ed). Campbell indicates that pipe rounds were common by the mid-C18, for talking of the age at which a youth should be apprenticed in the trade, he says "Fourteen or Fifteen is Time enough to bind a Lad, because tho' the Pipe-Making is not immoderately laborious, yet their Strength is tried in carrying Pipes to the publick Houses in the City and

Suburbs."

An inventory of the assets of a Lincolnshire pipemaker, Isaac Bilby of Spalding, made in 1728 lists a gross of fired pipes with a value of 15s (P.K. Wells, paper at Spring Conference of the Society for Post-Medieval Archaeology, Lincoln, March 1969; P.K. Wells 1972: 14) which represents a price of 1s3d a dozen. This must surely be an error - 1s3d a gross, or 1-1/4d a dozen, would be a much more reasonable price in the light of other near-contemporary evidence, and it seems likely the inventory intended to say 12 gross pipes valued at 15s. This mistake seems similar to the one noted above for prices in Liverpool in 1796 (Peter Wells and I have discussed this matter; the documentary source clearly states 15s as the cost of the gross but he feels the above explanation is the most likely).

Sheppard (1902: 4-5, 1912 ed) gives a number of entries taken from the household account book of Charles Warton of Beverley Parks, Yorkshire, relating to his purchases between 1709 and 1714. Most of his purchases were made by an agent, apparently in Kingston upon Hull, and not only is the price of the pipes given but the additional expenses incurred in bringing them from Hull are sometimes itemized. For example, a gross of Dutch pipes cost his agent 2s4d; the agent had to pay 1d for "carrying the pipes to the boat" and 3d for "a basket to bring the pipes in," and Warton then had to pay another person 2d to bring the pipes from Hull, bringing the total cost to 2s10d or almost a quarter more. (A subsequent entry indicates that the eight-mile journey from Hull to Beverley on at least one occasion, and probably in every case, was by water).

Warton was evidently fond of Dutch pipes, for he bought them on several occasions. A gross in 1711 cost 2s4d (the item noted above), in 1712 a half-gross was bought on two different occasions for 1s6d and 1s8d respectively, in 1714 eight dozen were bought for 2s8d, and in 1714 a gross for 1s6d. These figures (which exclude local delivery charges to Wharton) indicate the price of a dozen Dutch pipes varied between just over 2-1/4d and 4d. These prices were only slightly higher than those Wharton paid for English pipes (see below), which is surprising in view of their superior quality and when one considers they must have been shipped across the North Sea. However, Dutch labour costs were probably much lower than English costs: a 1719 reference (quoted in Donnan (ed) 1931: 241-2) notes that certain items used in the African trade were cheaper to obtain in The Netherlands than in England, pipes being one such item. (The source also noted that at least some of these Dutch goods were not allowed to be imported into England but that the African traders were now allowed to pick up these items from The Netherlands for the African trade, a point which will have to be considered when Dutch pipes are excavated from West African sites (cf I. Walker MS 3).) Whether Warton's prices for Dutch pipes included an English import tax is not known. Dutch pipes were apparently being legally imported before the end of the C17 (Houghton 1695/6: 1st page; repeated in Jewitt 1878: I, 293), but to judge by the variety of Dutch pipes found recently in Plymouth, most dating to ca.1630-70 and particularly to the second quarter of the century (Oswald 1970a: 122-42; 1970b: 230), they were being obtained illegally long before that, for the three C17 charters of the Westminster-London pipemakers' guild - 1619, 1633, and 1662 - gave the guild a theoretical monopoly of pipe-manufacture and had forbidden any pipes to be imported (see 3: I, also 2: IX). Dutch pipes also occur in C17 contexts at Kingston upon Hull (Oswald 1970b: 230-1; cf Sheppard 1902: 16, 1912 ed). There was a tax of 5s per gross between 17 May 1696 (7 and 8 Gul. III C.31, XLIX) and 1 August 1698 (9 Gull. III C.45, I) on Dutch pipes, but no tax of anything like this magnitude could have been levied when Warton was buying his pipes, for 5s per gross represents 5d per dozen, and Warton was buying his pipes for half this sum. (The tax, together with much lesser taxes on English pipes, was abandoned because it was "vexatious and troublesome and very chargeable in the buying and collecting of the same.")

On other occasions Warton bought what must have been English pipes. In 1711 he bought eight dozen "best" pipes for 1s6d (plus 4d for carriage) and the next year he bought three dozen of the "best" for 11d, figures which give prices of 2-1/4d and just over 3-1/4d per dozen respectively. On other occasions he bought unspecified types. In one case the price per dozen is 1-1/2d, on three other occasions the price per dozen works out to 2d. These prices suggest he was buying cheap pipes, presumably locally made. One occasion he was paying 3d per dozen for an unspecified type of pipe, and on another occasion - apparently exceptional - he paid 6d for one dozen of an unspecified type. From Warton's accounts we may suggest, therefore, that "best" quality English pipes cost ca.2-1/4d-3-1/4d a dozen, that Dutch pipes covered the same range but extended a little higher, and that cheap locally-made pipes were costing about one-half to three-quarters those of "best" quality.

The largest outlay for pipes, however, was for Nottingham pipes in 1714: two gross cost 5s6d, a box and cord for them cost 1s1d and two charges for freight from Gainsborough cost 8d altogether. This brought the total cost of the two gross to 7s3d, an expense which elicited the marginal comment "very dear, very dear" from Warton. An entry four days later shows the complexities of arranging for pipes (apparently another shipment from Nottingham) to be shipped from Gainsborough to Beverley, a distance of some 45 miles: "I paid Ed. Webster [the agent] for like he paid Thos. Cook for like he paid from Gainsborough to Hull for bringing by water from Hull to Beverley 2 gross of pipes 0s10d." (Gainsborough is some 35 miles from Nottingham towards Beverley and was a trans-shipping port of local importance (Beckwith 1967) - the pipes may have been bought there because it was the nearest place where Nottingham pipes could be obtained.) The cost of Nottingham pipes, excluding carriage charges, works out to 2-3/4d a dozen. Why Warton should apparently buy two large quantities within four days of each other when the transport costs were so high is not stated - three weeks previously he had also bought half a gross of Dutch pipes.

The Nottingham pipes were almost certainly ones with ornately-decorated stems - a number of these, usually incorporating the maker's name and that of the town in bands either within the decoration or one at either edge of the decoration - are known (Oswald 1959c: 206 fig 41; 1970b: pl 202, pp240, 229; Alvey 1973; see also 1: II(g) above). In this writer's opinion there is a definite Dutch influence in these pipes: the concept of decorated stems (and sometimes the form of decoration, as in the examples noted above), and the edging of the decoration with the maker's name and place of work all have parallels at Gouda (cf Humphrey 1969: 20, 19 fig 13c), and some of the bowl-shapes suggest Dutch influence; though certainly the makers' names so far recorded on the pipes are English. (The only other places in England where pipes with ornately-decorated stems are known to have been made are Chester in the earlier (Webster and Barton 1957: 19-28) and mid- (I. Walker 1971c: 70, 69 fig 11, 111 and 114-5, 108 fig 40 left) C18, and possibly Oxford (Oswald 1970b: 226, 244, pl 213) - for a discussion of decorated stems see I. Walker loc. cit.). According to Sheppard (1902: 4-5, 1912 ed), there is evidence that Warton was a miserly and unsociable character; if so, the sudden buying of quantities of Dutch and ornately-decorated Nottingham pipes in late April and May 1714 suggests Warton may have been entertaining important guests - possibly other entries in his account book would prove this. (Attempts to trace this book in the Kingston upon Hull Archives, the City Museum, the Library, and the East Riding Record Office have been unsuccessful). There are also entries indicating that Warton paid 1/2d a dozen for "firing" pipes - this referred to the refiring of used pipes, which burnt them clean again, though at some cost to their smoking qualities (Sheppard's alternative suggestion, that Warton made his own pipes and sent them out for firing, is hardly likely). Nicholas Blundell of Little Crosby, near Liverpool, twice recorded in his diary that he refired pipes, noting in 1719 that he "Burned half a Groce of Pipes" (Tyrer and Bagley (eds) 1970: 277) and in 1722 that he "Burned above one Groce of pipes in the Washhous Grate which are fully as many as I could conveniently" (Tyrer and Bagley (eds) 1972: 85). From the latter it is not certain whether he merely placed the pipes in the fireplace or not; special iron racks to hold pipes during refiring are known (e.g. J.S. Lindsay 1927: 69-70, figs 392-5, 1964 ed; Scott and Scott 1966: 44-6; there are examples at Blaise Castle Folk Museum, Bristol). George Sturt, recalling his boyhood - about the 1870s - remembered that after wheels had been shoed at his grandfather's wheelwright's shop at Farnham in Surrey the strake chimney (the oven used to heat the strakes before putting them on the wheel) was used to burn Churchwarden pipes

> After a shoeing, when the wood cinders glowed almost too dazzling to look at, a rack of churchwarden pipes was brought from my grandfather's house adjoining the yard and set down in the heat of the fire. When it was lifted out again the pipes were almost transparent with great heat; but cooling, they looked like new ones, chalk-white, with the last speck of nicotine burned from the bowl, the last stain of red sealing-wax from the mouthpiece. That was a fascinating sight for a boy.

However, George Sturt notes that by the time he took over the family business in 1884 Churchwarden pipes had gone out of fashion (Sturt 1923: 153, 1963 ed). In the middle of last century poor people cleaned their pipes by putting the bowl in a fire, and there was a business in collecting used pipes from the lounge bars of public houses, refiring them, and selling them in the public bars (Fairholt 1859: 179 n.; cf M. Phillips, 1918: 166).

Latimer (1893: 52-3, 214, 217) notes several purchases of pipes by the Bristol Council in the C18, but never in enough detail for precise costs to be estimated. For a royal visit in 1738 the Council spent 12s for approximately 800 pipes, which suggests a price in the region of 2s3d a gross or 2-1/4d a dozen. Twice in 1704 the entry occurs "a gross of pipes and for burning pipes 2s": assuming the process of burning old pipes cost ca.2d a dozen as it cost Warton a few years later one may conclude that a gross of pipes in Bristol cost something under 2s, depending on how many pipes were being burnt. If we estimate ca.1s9d for a gross this suggests a dozen could be sold for ca.1-3/4d, a price which included enough profit for the maker to live on. Doubtless these were good-quality pipes; those shipped from Bristol as part of the West Africa trade were very probably not, if a price for such pipes of 1s a gross - 1d a dozen - noted in 1725 (Donnan (ed) 1931: 326) is any indication. Equally cheap pipes, again only about half the price of those known for the home market about the same time, occur for pipes shipped to West Africa from London: pipes specifically listed for the use en voyage of slaves cost 1s a gross or 1d a dozen in 1691 (Donnan (ed) 1931: 372, cf 282 for reference to slaves being allowed to smoke en voyage). In 1714/5 pipes again specifically for the slaves' use cost 8d a gross or ca.3/4d a dozen while pipes on the same ship included in the general provisions and either for the crew or for trading cost 1s4d a gross of ca.1-1/4d a dozen (Donnan (ed) 1931: 181, 179).

Scattered references to prices of pipes in the C17 are known. The London guild, hearing of the impending tax on tobacco pipes referred to above, submitted a petition to Parliament (apparently in 1695) requesting the tax not be levied. The selling price the petition quotes is 1s6d-1s10d a gross, of which 2d or 3d was the greatest profit made. The price per dozen would thus be 1-1/2d to just over 1-3/4d, and the profit on a dozen 1/4d at most. The petition also notes that pipemakers, in order to obtain immediate necessities, had to sell their products at 3d or 4d less than prime cost, and says that if this can happen in cities, where there is a large production of pipes, the situation must be much worse in the country where production is so much less (quoted in Robinson and Spence 1937: 205-6). As already noted, however, the tax was levied for two and a quarter years, and probably did cause considerable hardship for pipemakers, for the levy was 1s per gross on ordinary pipes and 1s6d on polished pipes. Assuming the selling price of 1s6d-1s10d a gross noted above is for the ordinary pipes, the addition of 1s duty increased the price by over a half.

Noting the amount and value of pipes shipped from London between Michaelmas and Christmas 1698 to such diverse places as France, Spain, Barbados, and Virginia, Oswald (1960a: 48 - London is the port meant, cf 1959a: 59-60) gives figures which show these pipes were valued at 1s a gross or fractionally less, giving a price of ca.1d a dozen. This price is rather less than the 1-1/4d-1-3/4d a dozen for ordinary-quality pipes in 1695 noted above, but it is in keeping with prices for London and Bristol pipes used in the slave trade in the first quarter of the C18. The possibility that inferior-quality pipes were sent abroad must be kept in mind, but as noted below 1684 prices for pipes sold to the Hudson's Bay Company by a London maker cost 2d a dozen.

Houghton (1693/4: 205) gives the price of "ordinary pipes" as 1s6d the gross and polished ones at 2s or 3s a gross. These give prices per dozen of 1-1/2d and 2d-3d respectively. Houghton does not give any indication of a pipemaker's earnings, but does say six workers could make 60 gross pipes in a week. Assuming six workers represented an average establishment in Houghton's experience, 60 gross pipes sold at ca.2s a gross (assuming a mixed production of ordinary and polished pipes) would bring in, if sold in a week, £6. Assuming - arbitrarily - that half of this was profit the six workers might average 10s each. However, trimmers would, on McDougall's and Liverpool evidence, probably be paid about one-third the wage of moulders and be in a ratio to them of approximately one to two (though Liverpool - see Chandler 1957: 340 and Oswald 1970b: 228 n.6 - did indicate a ratio of one to one). At a guess the six workers noted by Houghton might comprise a master, two journeymen, two apprentices, and the master's wife. Apprentices might or might not receive pay (Lipson 1915: 309, 1959 ed), but if it is assumed that they were paid the same as the master's wife, then a combination of employees such as that suggested might be paid in a proportion of 3X (the master) to 2-by-2X (the two journeymen) to 3-by-X (the two apprentices and the master's wife) per week. Thus X would be equal 6s, which would be the wage of the apprentices and master's wife, while the journeymen would each receive 12s and the master 18s.

That six workers may not be unacceptably far off the mark as representing an average pipemaking establishment of this time receives indirect support from the 1696 list of London pipemakers' guild members who swore allegiance to William III and which has already been noted in 3: I. The list comprises 44 masters and 229 journeymen, suggesting an average ratio of former to latter of approximately one to five. An average-sized London pipemaking business of the period may thus have comprised a master and five journeymen, plus however many apprentices the master was permitted or bothered to take - the last in many cases perhaps not more than one or two when the skilled labour of journeymen was available. Six was also the figure noted in an advertisement of a pipemaking business for sale in 1757 at Great Yarmouth (quoted in Oswald 1970b: 239).

In the 1660s and 1670s in Bristol the Tilers and Plasterers' Guild and the Carpenters' Guild both set daily wage rates which gave a junior apprentice 8s for a six-day week, a senior apprentice and a journeyman 10s a week, and a master 12s a week (Latimer 1900: 346-7; F.H. Rogers 1949: 107). This suggests that there was less difference between wage rates, and also that the base rate was higher and the top rate lower, than in the calculations given above. If this Bristol evidence is applied to Houghton's "factory" and it is assumed that at the latter the staff comprised the master, two journeymen, one senior apprentice, one junior apprentice, and the master's wife, then a £3 profit when apportioned out gives the Bristol wages to the three classes (again assuming the master's wife earned the same as the junior apprentice) within a halfpenny. The Bristol wages are in proportion to each other in the ratio of 4 to 5 to 6: the master earns 6X, the journeymen and senior apprentice earn 3-by-5X, and the junior apprentice and master's wife earn 2-by-4X, giving a total of 29X to divide into £3 and making X a fraction over 2s. Thus the master earns ca.12s a week, the journeymen and senior apprentice ca.10s each, and the junior apprentice and master's wife ca.8s; and on a six-day week these figures give daily wages of 2s, 1s8d, and 1s4d respectively. Admittedly the £3 profit suggested from Houghton's evidence was an arbitrary figure, but the foregoing calculations suggest it may be an accurate guess.

In 1684 the Hudson's Bay Company bought 44 gross pipes from an Edward Jeffries for £2 18 8 (HBRS vol IX p.233; I owe this reference to A. Woodward, Amon Carter Museum of Western Art, Fort Worth, Texas - Atkinson and Oswald (1969: 212) note Jeffries working in London and taking an apprentice in 1699). This gives a price per dozen of 1-1/3d. The same volume of the HBRS (p.98) notes the purchase from Jeffries of 20 gross pipes plus four boxes on 20 April 1683 for £1 12 4, which indicates pipemakers supplied boxes in the later C17 much the same as the Angel Hotel, Abergavenny, ledger entries indicate occurred in the C19 (see above). In this particular case it is not possible to separate the cost of the pipes themselves from that of the boxes, but assuming the same cost as that of the order a year later, 1-1/3d, the 20 gross pipes would have cost £1 6 8 with the boxes costing 5s8d, or 1s5d each.

In 1681 Bristol corporation entertained the Marquis of Worcester and his two sons and expenses for the occasion included 1s10d for a gross of pipes (Latimer 1900: 405), giving a price - which one may assume was for the best quality - of slightly over 1-3/4d a dozen.

Another inventory of a Lincolnshire pipemaker's assets, this time of a Boston maker, James Harford, who died in 1676, includes, in addition to five tons of clay valued at £5, two lots of five gross pipes each valued at 5s - 1d a dozen (P.K. Wells, paper at Spring Conference of the Society for Post-Medieval Archaeology, Lincoln, March 1969; P.K. Wells 1972: 13); and a third inventory of a Lincolnshire maker's assets, that of John Fox of Spalding who died in 1671, included 50 gross pipes valued at £2 10 0 (P.K. Wells 1972: 14), figures which also give a cost of 1d a dozen.

Apperson (1914: 229, 64) gives costs for pipes taken from two sources in the C17. In 1671 the churchwardens' accounts for St Alphage, London Wall, note "For pipes and Tobacco in the Vestry 2s" and "For a gross of pipes at several times 2s" which appear to indicte that a gross of pipes in London at that time was costing 2s or less - 2d or less a dozen. In 1640 an Exeter citizen paid 1s5d for six dozen pipes, which gives a price of just under 3d a dozen.

In March 1651 the Duke of Bedford ordered a gross of the famous Gauntlett pipes from Hugh Gauntlett of Amesbury (see 3: I) - "you know the shape I like" - for the quite extraordinary sum of 18s6d, of 1s6-1/2d a dozen (Atkinson 1965c: 95 n.11, rev ed 1969b, citing Life of a Noble Household, accounts for Woburn Abbey and the Duke's London house). The following year, according to Atkinson, the price had gone down: how much is unfortunately not stated, but the private purse accounts for the Marquis of Hertford for the year Michaelmas (29 September) 1641-Michaelmas 1642 indicate almost exactly the same price for Gauntlett pipes as that paid by the Duke of Bedford: 36s6d for two gross, or 1s6-1/4d a dozen (Morgan 1945: 20). Substantially higher than usual costs are also given for other purchases of pipes for the Marquis. A subsequent purchase to that noted above was of two gross for 36s (Morgan 1945: 26), or 1s6d a dozen - from the price this too may have been for Gauntlett pipes, though if so it is not stated in the accounts. Four-and-a-half gross London pipes cost 31s6d, giving a price of 7d a dozen. On two separate occasions a single gross from an unspecified source is recorded costing 7s, again giving a price per dozen of 7d; and on another two occasions three gross from an unspecified source cost 21s6d, giving a price per dozen of just under 7-1/4d. (One of these three-gross purchases was for the Marquis's stay at York, where he went in April 1642.) Another entry records that "a pound of Tobacco Three dozen of pipes and a box for my honorable Ladie" cost 20s. (Whether the honourable lady actually smoked is regretably unclear, but other purchases by her of "a little Tobacco box" and a lb of tobacco suggests she did.) Entries of tobcco purchases indicate a lb of tobacco consistently cost 16s, but boxes sometimes noted with purchases of tobacco and pipes vary in price so that the cost of the pipes themselves cannot be calculated (Morgan 1945: passim).

These prices are so high, comparatively speaking, that it is tempting to conclude carriage must have been added to the cost. This would appear particularly reasonable in the case of the Gauntlett pipes, which were made at Amesbury in Wiltshire and must have been additionally expensive to distribute. However, at least one of the entries in the Marquis of Hertford's account suggests carriage was not included in the price, for the entry also notes a payment of the not inconsiderable sum for the time of 6d to the porter bringing the pipes. Gauntlett pipes must have been already famous by 1640 if marquises and dukes were ordering them in the 1640s and 1650s; a maker patronized if not by royalty then at least by high nobility probably was able to charge exclusive prices for his products. That 7d a dozen for superior-quality London pipes, as noted in the Hertford accounts, is not prohibitively high is suggested by prices suggested in 1619 by the Westminster guild on its incorporation and discussed below: only unusually high quality products were to cost more than 6d a dozen. London-made pipes suitable for the nobility might thus be priced as high as 7d; if so, the exclusiveness of Gauntlett products can be appreciated when one considers they cost a good two-and-a-half times the London pipes, which on other evidence can be shown to cost more than twice the 2d-3d charged for ordinary-quality pipes about this time.

Estate inventories of 1633 and 1622 for respectively a mercer and a merchant living on the Cornwall side of the Tamar from Plymouth, at Millbrook and Saltash, include in the case of the former, 1-1/2 gross pipes valued at 1s6d - which is 1d a dozen - and in the case of the latter "one grosse of tobacco pipes 1s6d" - 1-1/2d a dozen (Douch 1971: 146). These costs are surprisingly cheap for this early, but this may have been because of the relative nearness of Plymouth to the South Devon ballclay deposits, which may have been used this early even though documentary evidence is at present lacking (cf A. Oswald 1970a: 127 and n.4).

The Tobacco Pipe Makers of Westminster when incorporated in 1619 laid down that the price of best-quality pipes was to be "twoe at the least for a penny"; only pipes of "extraordinary greatness or unusuall curiosity of workmanshipp" were to cost more (PRO C.66/2206, Patent Rolls 17 Jas. I, 5 Oct, No 6). Thus a dozen best-quality pipes were to cost no more than 6d unless of exceptional size or workmanship, which suggests that ordinary quality pipes probably cost 2d-3d a dozen. Presumably the price given is retail in the sense that most pipemakers would deal directly with customers; however, as their charter gave them a monopoly in England and Wales one assumes that where pipes were not sold to the customer by the maker - which must have been everywhere except for the immediate area of the makers' premises or their rounds - the price would be higher. As the whole monopoly was unrealistic it may be that in practice few pipes made by guild members were ever sold in the provinces. (As Rogers notes, dealing with the Bristol guilds (1949: *passim*), some at least of the C17 royal monopolists came to agreements with provincial manufacturers and allowed them, in return for payment and having the quality of their produce checked, to manufacture a limited amount of their product for local consumption - Bristol soapmakers were allowed to continue in this way, for example, though in fact the London monopoly largely ruined that Bristol guild).

In 1605 the estate inventory of a prominent Helston shopkeeper includes "8 dozen tobacco pypes 2s" (Douch 1971: 146), which indicates a cost of 3d a dozen, a figure relatively high by later prices but in agreement with evidence that early clay pipes were relatively expensive items. The entry is also interesting in showing that pipes were available, and probably made, this early in Cornwall.

The earliest reference to the price of pipes so far found is 3d a gross given in 1599 at Barnstaple (quoted in E. Watkins 1966: 217 from a label in an exhibition case in the Barnstaple Atheneum, also seen by this writer). This appears to be an agreed price for which a local maker would supply pipes at the rate of two gross a week (though presumably this figure does not represent his entire weekly output even if he were hand-making his pipes and not mould-making them.) Thus a dozen pipes cost 3/4d. However, Barnstaple had a neighbouring deposit of ballclay (see 2: IX) which this maker must certainly have used, and so his price probably reflects very cheap clay.

TABULATED RESUME OF PIPE-PRICE EVIDENCE

Barnstaple 1599	3/4d a dozen
Helston 1605	3d a dozen
London 1619	6d a dozen - best quality prob. 2d-3d a dozen - ordinary
Saltash (nr Plymouth) 1622	1-1/2d a dozen
Millbrook (nr Plymouth) 1633	1d a dozen
Exeter 1640	3d a dozen
Marquis of Hertford's private accounts, 1641-1642	(7d a dozen for London pipes (1s6-1/4d a dozen for Gauntlett pipes
Duke of Bedford's accounts at Woburn Abbey and his London house, 1651	1s6-1/2d a dozen for Gauntlett pipes
London 1671	ca.2d a dozen
Lincolnshire 1671	1d a dozen

Bristol 1681	ca.1-3/4d a dozen	
bought by Hudson's Bay Company, London 1684	2d a dozen	
London 1691	1d a dozen - for use of slaves being shipped to North America from Africa	
Houghton 1693/4	1-1/2d a dozen - ordinary 2d-3d a dozen - polished	
London 1695	1-1/2d-1-3/4d a dozen - ordinary	
London 1698	1d a dozen - pipes being exported to France, Spain, Barbadoes, and Virginia	
Bristol 1704	1-3/4d a dozen	
Beverley 1709-14	1-1/2d-2d a dozen - cheap English 2-1/4d-3-1/4d a dozen - best English 2-3/4d a dozen - Nottingham pipes 2-1/4d-4d a dozen - Dutch	) prices exclude carriage charges
London 1714	(ca.1-1/4 a dozen - for use on board (slavers presum. for crew (ca.3/4d a dozen - for use of slaves (being shipped to North America (from Africa	
Lincolnshire 1728	prob. 1-1/4d a dozen	
Bristol 1725	1d a dozen - for trading with West Africa	
Bristol 1738	ca.2-1/4d a dozen prob. wholesale	
Liverpool 1796	prob. ca.2d a dozen prob. wholesale	
Bristol 1799	3d-5d a dozen "long" pipes, glazed 2-1/2d-4-1/2d a dozen ditto, unglazed ca.1-3/4d a dozen "common long" pipes 1d-ca.1-1/4d a dozen "short" pipes for various export markets	) a common advertisement for four Bristol firms
London ca.1799	ca.2-1/2d a dozen (?)	

London 1809	(1) 2-1/2d a dozen) (2) 3-1/2d-4d a dozen)	(1) was price before journeymen struck for higher wages, (2) was price after higher wages obtained
Bristol 1812	1-1/2d a dozen - type name beginning "Ne...", rest obscured) ca.1-1/4d a dozen - "Hunters")	a common advertisement for six Bristol firms
London, post-1809 strike to 1818	3-1/2d-4d a dozen	
bought by the North-West Company, London 1820	ca. 3-1/4d a dozen	
Poole 1828	2-1/2d a dozen - exported to Newfoundland	
Knockcroghery, Co. Roscommon, some years before 1832	2-1/2d a dozen wholesale - small and poor quality	
ditto 1832	1d a dozen wholesale - ditto	
Edinburgh 1840	3-1/2d a dozen - best quality 21-ins long	
Glasgow prob. ca.mid-C19	(2-1/2d a dozen - best quality 16-ins long (3-1/2d a dozen - best quality 21-ins long	
London 1850s - *Fairholt*	6s a dozen retail - French	
Mayhew	6s a dozen retail - porcelain: English? German?	
Fairholt	(ca.1-1/4d a dozen wholesale) (3d a dozen retail)	cutties
Apperson	6s a dozen prob. retail - Milo's and Inderwick's clays	
Penn	6s a dozen retail - "moulded with figures"	
Broseley 1850s-1870s	2-1/2d a dozen "best Broseley pipes" and "B Smoke Rooms" (latter 20-ins stems) 4-3/4d a dozen "Best P. Tipt" 6d a dozen "B s Pips"	

Bristol 1860s	2-3/4d-3-1/2d a dozen "Straws Glazed Pipes" and "Broseleys" - both types 19-ins long
Scotland ca.1861	2d a dozen (presumably cutties)
Lincolnshire second half C19	(2d-3d each Churchwardens retail (1d for three or four cutties retail
London 1875	2d-3d a dozen retail - short and medium-length straws 4-1/2d a dozen retail - 16-ins straws 6-1/2d a dozen retail - "Fancy Clay Pipes, With Glass Eyes"
London 1879	ca.1-3/4d 2d a dozen - cheapest varieties, incl. cutties 2-1/2d-3-1/2d a dozen - decorated and bent varieties 2-3/4d-5-1/2d a dozen - long-stemmed varieties, 8-18 ins
Bristol 1892	1-1/2d a dozen wholesale - Irish, Straws (long-stemmed pipes), and meerschaum patterns 1d a dozen wholesale - assorted cutties
Bristol ca.1900	local rhyme current in the pipemaking area of St Jude's referred to publicans selling "farthing pipes", indicating a retail price (undoubtedly for the cheapest types) of 3d a dozen
Scotland 1900	ca.3/4d a dozen (wholesale) for average types up to 1-3/4d a dozen for other types, including 21- and 22-ins pipes various additional costs depending on certain features and type of clay used
Leicester ca.1900	2s6d a dozen retail) tripartite 6-1/2d a dozen wholesale) moulded 3/4d a dozen wholesale - cutties (to publicans who gave them free to customers)

Rainford ca.1900	3d a dozen retail
London? pre-1914	2d a dozen retail 1d-6d a dozen wholesale depending on type of pipe
Nantgarw pre-1920	2-1/2d-4-1/2d a dozen wholesale
Glasgow ca.1920	6d a dozen retail
Dundee early 1930s	1s a dozen retail - plain 2s a dozen retail - "glossy"
Manchester 1930s	2s a dozen retail - cheapest
Cheshire ca.1940	2s-3s a dozen retail - cutties up to 9s a dozen retail - Churchwardens
Broseley pipe bought in Leicester ca.1960	4s6d a dozen retail
Manchester pipes sold in Bath 1968 SHOP I	12s a dozen retail - cutties 15s a dozen retail) 21s a dozen retail) various sizes of 27s a dozen retail) Churchwardens
SHOP II	27s a dozen retail - cutties 60s a dozen retail - long Churchwardens
Cutties of unknown origin sold in Bath SHOP III	10s a dozen retail

(In 1972 Pollock's were selling their cheapest clay for 10p (2s in pre-decimal currency) each, i.e. 24s a dozen, while their range of varnished clays with vulcanite stems (examples in FIG 108) cost from 90p (18s) to £2.20 (44s) each (B. Rogers 1973: 26).

No attempt has been made to compare these prices to those of briers over the past century or so, but a brief survey of prices in 1969 showed a range from 10s6d for manufacturers' rejects in a Bath shop to £10 for certain Alfred Dunhill pipes in Edinburgh and London. At both extremes these prices were for pipes of normal shape and size. Astley's of Jermyn Street, London, had pipes priced considerably higher - one at £50 was noted; and another, costing £250, bore (as well it might) the label "best briar ever." (Astley's also sell meerschaums: one was noted priced at £83.) The most frequently-listed prices for briers, however, appeared to lie between ca.£1 10s and ca.£3. An undated catalogue of the Kaywoodie pipe firm of New York (Anonymous n.d. [7]: back cover) obtained by this writer in the earlier 1960s listed the Kaywoodie Presentation Collection of 28 matched grain Kaywoodie briers, a carved head brier, a calabash, and a meerschaum together with a walnut cabinet with tobacco humidor and a brass plate engraved with the recipient's name for $2,500. Over 500,000 brier blocks had to be sorted to provide the brier for one set of these pipes, and only 12 sets could be produced in a year. The ultimate in expense for a single pipe, according to that compendium of esoterica The Guinness Book of Records (N. and R. McWhirter (eds) 1972 ed: 154), is $2,500 for a Charatan of London straight-grain brier called Summa cum Laude and available in limited quantities in New York, while the Charatan set of seven - one for each day of the week - known as "The Crown Achievement" costs $10,000 (Dunn 1973: 33).

Fairholt (1859: 198-9) noted that he was writing, the recently-introduced brier pipes were "expensive, the bowls costing three shillings each." This rather implies the stems came, and were charged for, separately. The exclusive tobacco firm of Fribourg and Treyer, patronized by royalty, was selling "Briarwood Pipes" in 1859 (G. Evans 1921: 37) - not, as Mackenzie (1957: 259) says, 1879 - at 7s each, presumably including stems, or 11s with case. Mackenzie (loc. cit.) suggests the pipes in cases may have had amber stems but that the others would have had horn stems, but there is no evidence to confirm this. A. Dunhill (1924: 246-7) notes that horn stems were locally manufactured in the Saint-Claude area from the beginning of brier-pipe production there in the mid-1850s (see 1: VII(h)), there being a traditional horn-working industry in the Jura, and that ivory and amber were used to make stems for deluxe pipes. The stems of the brier pipes from the Bertrand shipwreck on the Missouri in Nebraska in 1865, which date to within 10 years of the introduction of brier pipes, were of wood (see 1: VII(h)).

If Conan Doyle is to be trusted, an inexpensive brier pipe with a stem probably of fake amber cost ca.7s6d towards the end of the C19. In "The Yellow Face", written in 1893, Holmes, after commenting on the prevalence of fake amber for stems - "Why, it is quite a branch of trade, the putting of sham flies into the sham amber" - judges a well-used brier conveniently left by a visitor to have originally cost 7s6d. He goes on to opine the owner must be well-to-do, and when Watson asks Holmes if he thinks a man must be well-to-do because he smokes a "seven-shilling pipe", Holmes points out the owner smokes Grosvenor mixture at 8d an oz when he could get an excellent smoke from tobacco half that price. The implication here is that a 7s6d pipe is not an expensive one even if it had an amber - or imitation amber! - stem. (Michael Harrison in his In The Footsteps of Sherlock Holmes (1958: 95, 1971 ed) notes that ca.1880 briers with an amber stem cost 35s, best-quality plain briers 12s6d and upwards, cherrywoods 1d-2d, and clays 1/4d-3/4d, while "finest quality, guaranteed to colour" meerschaums were 12s-35s.)

The Hovenden catalogue of 1875 referred to above creates a major problem here. It lists "first quality" briers with horn stems at 2s-8s a dozen depending on size - small, medium, or large - and type; "second quality" pipes could cost as little as 1s2d a dozen. Name brand briers with horn stems are listed at 10s to £1 a dozen, with ivory stems at 11s to important chance £1 4s, and with amber stems 18s to £1 16s a dozen (Anonymous 1875: 108-9). These prices could conceivably have been wholesale, but if that were the case the listed prices for clay pipes, which do fit the known range for retail prices (see above) would become far too high. At a guess, this writer would hazard that the "Per doz." heading above the prices is a misprint for "each", the heading used in the catalogue when giving prices for meerschaum pipes. Even at that, 1s2d for a small "second quality" brier seems extraordinarily cheap. (The firm's meerschaum pipes cost between 3s and £1 each depending on size and whether they were carved, though assorted patterns of plain meerschaums could be bought for as low as 12s-18s a dozen; immitation meerschaum pipes were priced from 2s-5s a dozen. The true meerschaums were normally sold without stems; immitation meerschaums with stem and chain-attachment between stem and bowl were listed at 4s6d per dozen for "common" pipes, 8s per dozen for "large plain bowls", and £1 4s per dozen for "Zouaves' heads, assorted" (illustrated). What was called an Abyssinian bowl - also illustrated - cost 2s a dozen in immitation meerschaum and 3-1/2d per dozen (3s6d a gross) made in pipeclay, giving an idea of relative cost, though the latter must have been made in Britain whereas the former would probably have been imported (prices and illustrations in Anonymous 1875: 109-10).)

SECTION II:
WAGES

The extremely scattered evidence can give only the vaguest idea of price and wage trends, for both prices and wages must have varied greatly with area.

As noted in the preceding section, McDougall's ca.1948 were paying a moulder ca.3s3d a gross and a trimmer ca.1s3d a gross. Taking the figure of three gross as the average daily production for pipes (see preceding section), McDougall's moulders ca.1948 would have been earning ca.9s9d a day or ca.£2 13 7-1/2 for a five-and-a-half-day week, and their trimmers ca.3s9d a day or ca.£1 0 7-1/2 a week. Latterly McDougall's used a makeshift system of payment which was a compromise between piece- and time-rate, but had they followed the old system, they estimated they would have been paying a moulder in 1967 ca.9s a gross and a trimmer ca.3s a gross. At these rates a moulder would theorectically have been earning ca.£6 15s for a five-day week and a trimmer ca.£2 5s.

As also noted in the preceding section, Southorn's of Broseley were paying their workers 2s6d an hour ca.1958. As they were women workers they were probably paid less than men would have had to be paid and in any case they were only part time workers, but assuming a 47-1/2-hour five-day week Southorn's workers would theoretically have earned £5 18 9 a week at that date.

The 1900 price-list for Scottish pipes (Anonymous 1900) noted in the preceding section gives some hints on earnings at that time. The prices of the pipes given are in accord with what other evidence there is for wholesale prices about this time, and therefore presumably represent production costs plus company profit. A manuscript addition following the last page - p.63 of the booklet - and numbered p.64 is a fragment of a letter dealing with wages paid a trimmer for a "T.W. Cutty" pipe. The letter, dated 29 April 1903, is from 32 Kerr St, Calton, Glasgow, and addressed to a Mr William Christie. 32 Kerr St was the address at this time of John Waldie and Co and also of James Reid and Co; the letter is probably from Waldie's as they appear to have been one of the three major Glasgow pipemakers at this time, to judge by prefatory notes in the price booklet. The William Christie to whom the letter was sent must have been either the Glasgow Christie or his son in Edinburgh - both were called William. As the book is now in the Huntly House Museum in Edinburgh along with Christie's reconstructed workshop it is likely it was addressed to the Edinburgh Christie. The letter begins "Dear Sir, In answer to yours of 27th inst, we pay for finishing T W Cutty 1-3/4 [sic] per Gross, and expect this is the correct price, but...." at which point the letter has been torn.

As noted in the preceding section, McDougall's in earlier times paid finishers between one-third and a half what they paid moulders, which suggests that here a moulder would have got ca.4-1/4d a gross for the T.W. Cutty, making a direct labour cost of ca.6d a gross. The 1900 price-list gives the price per gross of Waldie's T.W. Cutties as 8-1/4d, from which one can deduce the firm's profit would have been ca.2-1/4d minus fractions of the costs of the clay, of the fuel for stoving and firing, and of materials for packing and shipping; labour for the preparation of the potting (putting the unfired pipes in the saggars), firing, packing, and local distribution (see p.152 above); and of the wages of supervisory and clerical staff. Such a profit must have been minimal, perhaps 1d a gross, though for the more expensive pipes - those priced in 1900 at ca.11d a gross and higher - it would no doubt have been somewhat more. One penny a gross clear profit would mean a profit of only 3d a day on one moulder's output, or 1s6d a week; with 100 moulders - and even as late as 1914 McDougall's, and probably White's, must have had about this number (see p.342 above), the clear profit on this calculation (excluding capital expenses, building maintenance, taxes, and the like) would have been only £7 10s. True, this is fifteen times the wage calculated below for the moulder and four to five times the wage of well-to-do Glasgow artisans at this time (see below), but it hardly seems remunerative enough to classify pipemaking as a prosperous business, even if with sales of pipes giving a greater profit than 1d a gross the weekly clear profit could be increased to ca.£10. Of course, by 1900 the heyday of the Glasgow pipe-industry was over - the real days of affluence (for the owners - the workmen can never have been other than at poverty level or below) in the industry must have been the third quarter of the C19, and as noted in the preceding section Glasgow pipes were being sold in mid-century for double the price they were in 1900, indicating a vast drop in profitability during the second half of the C19 (probably the last quarter). One would like very much to have detailed company records for the second half of the C19, but none appear to have survived. McDougall's when they closed in 1967, had few early papers, their premises having suffered two fires this century (Walker and Walker 1969: 132), while all White's material, including files, was destroyed when their 130 year old premises was taken over in 1955 by a footwear firm (Glendale Footwear Co Ltd *in litt.* 12 January 1968).

A printed note in the preface to the price list quotes a letter from McDougall's to Davidson's (signed by McDougall's, Waldie's, and White's) dated February 1895 dealing with payments when a worker had to change from one mould to another during the work-week: "when a man has more than one setting within one week he is entitled to a 6d. for said extra setting, and also 6d. for each additional setting he may have to make within said week". This clearly reflects the piece-rate method of payment, for a worker changing moulds would lose time doing so and also lose his production rhythm if he had to make different-sized rolls necessitating different amounts of clay, a different number of rubs to produce the roll, and a different length of wire. As noted in Section I above, the workers had some say in fixing pipe prices, doubtless because their wages were a proportion of the selling price. Thus the dispute at McDougall's was settled with agreements that no new pipes were to be sold at less than 8-1/2d a gross, though present 8d a gross pipes were to remain at that price.

Again assuming an average production of three gross a day, on the above figures, if the moulder of Waldie's T.W. Cutties did receive ca.4-1/4d a gross, he would have earned ca.1s0-3/4d a day, or ca.6s4-1/2d a week.

Various extras such as the 6d for any change of mould and presumably a proportion of the increased prices charged when plugs and venting needles were added, or when different types of clay were used, or when some modifications were made to the moulding process or the pipe shape as noted in the preceding section are unlikely to have added materially to the weekly wage, for as indicated above the reason for their payment was to compensate for loss of production, and therefore lower wages, caused by these changes lowering gross output. There can be no doubt these were rock-bottom wages and far below poverty level. Butt (1971: 67, 82, 85) notes that surveys made in 1901-03 among those using Glasgow lodging-houses suggest unskilled labour could earn on the average in good times 22s-25s a week, though taking irregular employment and broken time into account the figure was probably 16s-18s in reality. Carters' and vanmen's earnings ranged from 16s to 30s a week, averaging 21s2d; labourers' wages ranged from 16s to 26s and averaged 19s; and porters earned 15s-25s, averaging 17s9d. By contrast, well-to-do artisans were earning 30s-40s in secure employment. It is clear therefore that the 6s6d or less a week calculated as a Glasgow pipemaker's wage in 1900 can only have been a contribution towards a weekly accumulation arrived at by the united earnings of several of a family; even so, however, a family the man of which was earning less than 6s a week cannot have totalled more than ca.15s. By ca.1900 the Glasgow industry was in decline, and as noted in the preceding section Glasgow pipes being sold ca.1850 were double the price they were in 1900. While it is unlikely this indicates pipemakers' wages ca.1850 were double that of 1900, it does seem probable their wages were higher than in 1900, perhaps 9s-10s a week, though it is unlikely even this represented anything above poverty level.

As is discussed later (p. 440 and 443-4), a number of inventories of the estates of deceased pipemakers are known from various parts of the country for the later C17 and earlier C18, but unfortunately only one has so far been noted for later times; and even that as listed gives only the total of the personal estate. William Cock of Truro, who is first noted in 1850 when a son, also William, was baptized, left personal estate valued at £56 13 3 in 1881; a son Alfred continued the family business while William's widow Jane set up her own business nearby on the same street, "where she carries on pipemaking in all its branches, and hopes for a continuance of the support accorded to her late husband" (Douch 1971: 153). Some sort of family dispute is hinted at here, but it is difficult to judge William Cock's status from his estate value without seeing what his actual possessions were - it is certain, however, that at this late date there must have been a great many pipemakers who had very much less estate than Cock had.

As noted in Section I above, the journal of a Lincolnshire pipemaker, George Spencer Watkinson, in the second half of last century (Hallgarth 1969: 34) gives piece-work rates of pay for journeymen. These were 1s6d a gross for 24-ins pipes, 1s a gross for 18-ins pipes, 9d a gross for 10-ins pipes, and 7-1/2d a gross for 4-1/2-ins pipes. The girls trimming the pipes received 1d-3d a gross depending on the size of the pipe. The author of the journal notes that good journeymen-workers might earn 20s-24s a week, but at this point he is also talking about journeymen of the period in general, and the piecework rates suggest a journeyman-pipemaker earned rather less than this rate, for taking a daily average production rate of about three gross a day and assuming the 18-ins pipes, which were called "common clays" here, were the most commonly-made pipes, a pipemaker would earn ca.18s in a six-day week.

The apprenticeship indenture of George Marsh to Thomas Bellamy of Lambeth dated 4 April 1864 and binding Marsh for seven years is on display at the "House of Pipes" museum at Bramber in Sussex (seen there by this writer October 1973), and it gives the following rates of pay for Marsh: 5d a gross for making and trimming short pipes and 6d a gross for long pipes during the first half of his apprenticeship, and 6d a gross for all sizes of pipes in the second half. Assuming Marsh turned out to be a successful apprentice, he would have been fully proficient long before his apprenticeship was up and would thus have been producing the standard three gross or so daily, which would have earned him ca.1s6d a day or ca.9s a week. This is the same figure Thomas Hughes of Broseley, apprenticed 1848, would have earned assuming he too had been a successful apprentice (see below): as in Hughes's case, the master did not supply food and drink, Marsh being described as an "outdoor apprentice", presumably indicating he lived with and was clothed and fed by his family. Marsh's indenture had the usual stipulation admonishing him not to lie, sell his master's pipes, do damage, and to warn his master of any danger. The reference to Marsh being expected to do both the moulding and trimming of his pipes is interesting, and no doubt reflects the declining condition of pipemaking at this time, it being no longer economical for his master to employ specialist trimmers. What Marsh would have earned as a journeyman is difficult to say: by 1873, when he would have finished his apprenticeship, the English clay pipe industry was rapidly dying. Assuming he would have been able to get steady work at all in the trade, it seems unlikely he would have been getting very much more than what he had been earning as an apprentice. At a guess, and bearing in mind Booth's poverty-level of 18s for London in the 1890s, Marsh might have earned in the region of 10s-12s a week if he were in regular work.

An 1850 account of the Bristol industry noted briefly above and dating to about the period of greatest prosperity of the industry there in the C19 (see 6: VI) indicates pipemaking in Bristol was carried on mainly by women working in the small factories in the St Jude's area and that they were paid 4d per gross of 180 pipes (anonymous correspondent to the Examiner 17 August 1850). Assuming an average production of 3 gross a day or 18 gross a week, a maker at this rate would earn ca.6s a week; but in his following communication, that for 24 August - these communications took the form of letters describing the Bristol poor (see 6: VIII) - the same correspondent noted that a woman "who had been engaged in the trade from a child and was considered expert at it" had subsequently assured him her earnings never averged more than ca.4s a week and recently had been much less, employment at that particular time being especially scarce and the United States and Canadian markets having been virtually entirely lost within the preceding three or four years.

However, ca.6s a week does in fact seem to have been enough for a family to exist on in St Jude's at that time. The pipemaker described in the account (who appears to have done work contracted out from a firm in the area) was "not strong enough to be very expert in the business" and had only started in the trade on the death of her husband so that she could average only 9 gross a week, which earned her 3s a week when fully employed. Out of this, 5-1/2d went to a man who mixed and prepared the clay for her, but a son contributed 2s a week by picking horsehair and the parish gave her 1s and a loaf of bread towards the upkeep of her youngest child. This gave her a total income of 5s6-1/2d plus a loaf of bread a week, an apparently livable wage for her and her three children, the youngest of whom was a five- or six-year old girl.

Of this sum, 1s6d went on rent (reduced 3d since her husband had died). The remaining 4s0-1/2d went mainly on bread, which was cheap; butter was rarely used. Some potatoes and a little meat, and the luxury of one oz of tea a week, formed the balance of the family's diet. The home was reasonably furnished for its class; the woman was described as "decently-attired". From this, therefore, one must assume that the poverty level in St Jude's in 1850 was much lower than Booth's in London ca.40 years later, and indeed as low as the Oxfordshire Quarter Session figures for 1795 and Eden's for the Wiltshire agricultural village of Seend in 1797 (see pp438-9 below). In 1843 Somerset agricultural labourers existed largely on bread and potatoes with occasionally a little bacon or cheese (Hunt 1967: 286), a diet as poor as that of the widow pipemaker; the weekly wage of a Somerset agricultural labourer is not given, but in neighbouring Wiltshire in 1850 it was 7s3d, plus, however, the equivalent of several shillings' worth of payment in kind but even so about the lowest wage for agricultural workers in the country (Hunt 1967: 280). Unfortunately, this writer does not have any figures for wages in other trades in Bristol in the mid-C19; but in 1889 Wills's tobacco firm were paying 21-year old unskilled male workers 20s a week (the firm in fact paid on a scale depending on age, a 13-1/2-year old earning 4s and a 30-year old, 25s) (Alford 1973: 285). In 1892 a Wiltshire agricultural labourer was earning only 14s9d including payments in kind, and the figure was virtually the same - 15s - in January 1914 (Hunt 1967: 280, 291). The fact that the majority of Bristol pipemakers were women (see also census evidence, 6: VI below) suggests there would have often have been a second and major breadwinner in the family, so that a full family might be earning up to ca.15s or more at the time. Doubtless, however, a number of the women pipemakers were widows trying to support a family. Further, it was certainly the impression of the correspondent (letter of 17 August) that while nearly all the women and many of the children right down to the very young worked, many of the men sat or lounged in the street every day.

On these figures, therefore, the Glasgow figures for 50 years later could be considered accurate enough, as presumably those employed were not normally the sole wage-earner in their family. The fact remains, however, they like their Bristol counterparts must have been at best chronically poor. The wage of ca.£1 paid by Watkinson at Market Rasen in the second half of the C19 certainly seems unduly high by comparison; further research on wages at this period seems indicated. An interesting source of some figures for wages of this period, though clearly they can be taken only as generalized guides, are some of the street ballads. In one, datable from its imprint to the 1879s though earlier versions may exist, 15s a week provided a complete budget for a working man, his wife, and seven children - rent was 1s9d, fuel 1s10-1/2d, tobacco and tea each 8d, with clothes being bought second-hand, a jacket costing 6d and socks 3d. Another street ballad printed probably earlier than 1870, gave the weekly budget of a tradesman and his wife - no children mentioned - as 25s, rent here being 3s2d, and 4s-worth of meat and 6d-worth of tobacco being listed. Also listed was a 3/4d rushlight "every night, to catch the bugs and fleas" (both ballads noted in Neuburg 1973: 197). Despite the obviously general nature of such statements, other evidence collected and noted in this section tends to bear these figures out; and poorly-off though the working man with a wife and seven children existing on 15s may have been, all the evidence suggests pipemakers by this time were appreciably poorer, which reinforces one's suspicions that Watkinson would not have paid ca.£1 to his pipemakers.

In 1848, Thomas Hughes of Broseley was apprenticed to William Southorn of Broseley at the age of 12 for nine years' "full and constant work for the payment of sixpence per gross for rolling and moulding short common pipes, the said payment to be made fortnightly during the said term." The money was to be paid to Hughes's widowed mother, who in return had to supply the boy's food, drink, and other necessities (the indenture is reproduced in Anonymous 1968c). Undoubtedly long before the nine years were up Hughes, assuming he was a successful apprentice, would have been a fully-proficient pipemaker: assuming again that three gross pipes a day was the average production rate for clay pipes then at the wage indicated Hughes would have been earning ca.1s6d a day or ca.9s for a six-day week (i.e. ca.18s a fortnight). What he would have earned as a journeyman pipemaker can again only be guessed at: by 1857, when his apprenticeship would have been over, the brier pipe and the cigarette were just coming in heralding the beginning of the end for the clay pipe industry. With the Southorn firm continuing to produce quality pipes into the C20, however, and with other Broseley firms such as Smitheman also working into the C20, Hughes would probably have had a better chance than most at least to obtain steady employment if he were good enough: at present there is no evidence as to what Southorn's paid their workers, but by the second half of the C19 it cannot have been much more than Hughes had earned as an apprentice - perhaps, as with Marsh (see above), ca.10s-12s a week. In Hughes's indentures the capital offence was considered to be selling his master's pipes to his friends for his own profit: for this he was to be dismissed and his mother to forfeit the very large sum of £50. This perhaps reflects the poverty of the trade, when the tiny profit from each sale had to be jealously guarded in a constant struggle to make ends meet.

On the general level of wages last century and earlier, Wood (1899), studying average wages in towns for the period 1790-1860, showed extremely wide variation among 24 centres (Bristol, unfortunately, is not among them). Further, figures for wages have little meaning unless related to the cost of living. The most comprehensive studies of the cost of living during the later C17, C18, and early C19 (Gilboy 1936; Schumpeter 1938) suggest that, at least in London, there was a slight overall fall in the cost of living between the 1660s and the 1750s, after which it began to rise. From ca.1790 the rise became extremely rapid, with violent fluctuations, and reached its peak ca.1812. Earlier work, using different evidence (Silbering 1923), indicates the same pattern over the last decade of the C18 and the first half of the C19, with only a gradual decline in the cost of living towards the 1830s.

The indices of real wages - that is, the buying power of actual wages in relation to the cost of living - for London and Lancashire (Gilboy 1936) show an almost identical progression, representing an overall slight increase in real wages, until ca.1760. Thereafter, real wages in Lancashire continued to rise; rapidly until ca.1770, then fluctuating around a steady level or rising very slightly overall until the indices cease in the 1790s, at which point there is a suggestion that real wages were dropping. In London on the other hand, real wages dropped steadily in the 1760s and then fluctuated around a steady level until the 1780s, at which point the indices cease. At this point the real-wage index for Lancashire is averaging between 150 and 200 while that for London is averaging between 80 and 100, 100 in both cases being the 1700 level.

Wood's indices for average wages in towns during the first half of the C19 (with 100 equalling the 1840 level) suggest that while in some centres wages did rise and fall in a pattern approximating the rise and fall in the cost of living this was by no means the case everywhere. Sheffield, for example, had an index of 110 for 1800 which rose to 130 in 1805 and 150 in 1810 and stayed over 140 until the later 1820s, falling to 130 in 1831 and 100 in 1840. Coventry's index rose from 100 in 1800 to 165 in 1810, falling to 103 in 1820 and rising to 125 in 1824 before dropping to 105 in 1831. Leeds's index rose and fell in a regular curve similar to Sheffield's, though less pronounced. In Liverpool and Manchester on the other hand, indices fell below 106 in the 1810s and remained at or below 108 until the later 1840s - in Manchester the index was still only 100 in 1860 (Wood 1899: 591 table).

The one reference to wages earned by pipemakers in Liverpool ca.1800 is of limited value. The cost of living was rising rapidly at this time, and to judge by Wood's figures the average wage in Liverpool by the end of the C18 was very rapidly declining in terms of buying power. Whatever standard the wages given may indicate for 1800 they would support an appreciably poorer standard if applied ten, or even five years later - Gilboy's indices for the London cost of living for 1796, 1801, and 1806 are 153, 190, and 201 respectively (Gilboy 1936: 137 table 1). Unfortunately, Wood has Liverpool average wage indices only for 1790 and 1810 in this particular period - 79 and 106 respectively - which suggests that during this period wages were at least following the increasing cost of living; but as noted above after 1810 the Liverpool wage indices fall badly in relation to buying power.

Liverpool, as is noted in 4: II, was perhaps the one pipemaking centre in the country which appears to have had a prospering pipe industry in the later C18. It is quite certain from the depressed state of the Bristol industry in the closing decades of the C18 as recounted by John Frederick Bryant jr (1787: vii-xxxiii) that Bristol pipemakers, far from earning the sort of salaries indicated for Liverpool makers, were in many cases out of work and destitute. In view of the relative decline of Bristol as a port by the end of the C18 it is unlikely that Bristol wages kept anything like pace with the increase in the cost of living from ca.1790, especially as

Liverpool, which had captured Bristol's place as the first outport, was unable to keep its wages in line with the cost of living. London, after increasing its wage index from 86 in 1800 to 109 in 1810, saw its indices slowly drop from 109 in 1816 to 100 in 1831; and by 1860 the index was still only 105 (Wood 1899: 591). It is likely, therefore, that Bristol - like Liverpool and London, not a heavy manufacturing centre - went through a period of lowered real-value wages in the opening decades of the C19. This would be in keeping with Gilboy's conclusions that real wages in the west of England, while not computed for her study, would show a similar decline to those in southern England, a decline which would indeed have started much earlier (Gilboy 1936: 141). It therefore seems safe to say that Bristol pipemakers, even in their days of affluence before the Stamp Act and the American Revolution would have been earning less than the amounts indicated for Liverpool makers in 1796.

However, the status of Bristol pipemakers relative to other tradesmen in Bristol appears to have been distinctly favourable prior to the Stamp Act and the American Revolution. The George Champion who is listed as a pipemaker in Matthews's directories between 1794 and 1800 was apparently, according to Minchinton (ed) 1957: 69, 190-1), the same George Champion who was a shipowner and a Warden of the Society of Merchant Venturers in 1770 and who went bankrupt in 1781; though whether he was connected with pipemaking at this earlier time is uncertain. John Frederick Bryant sr, according to his son John Frederick Bryant jr, employed ten journeypeople and was able to keep his wife and nine children in some comfort prior to the Revolution. Other evidence can be found in Bristol's earliest trade directory, Sketchley's Bristol Directory... of 1775, the year the Revolution started: four of the 11 pipemakers listed - one a John Bryant who was John Frederick Bryant sr - lived in Lewin's Mead in company which included two aldermen and an expensive Quaker school, which indicates the area was fashionable and not yet the slum it was quite early in the C19 (cf Latimer 1893: 421, 438 and 1887: 174, 296; cf also Winstone 1970a: pl 62 for a photograph of Lewin's Mead dated ca.1850).

According to Little (1954: 174, 1967 ed), a Bristol labourer ca.1770 earned 8s-9s a week, which was enough to live on and substantially more than the 4s-5s a week in winter and 6s a week in summer recorded in 1768 for agricultural labourers in some parts of Gloucestershire, though much below the 13s-15s earned by Bristol craftsmen such as masons and plumbers. Bristol sailors in 1768 struck unsuccessfully for a 5s increase to bring their monthly wages to 30s, indicating a weekly wage of 6s3d (Latimer 1893: 384-5). In the much-diminished but apparently still fairly prosperous Bristol pipemaking industry before the Stamp Act and the American Revolution, therefore, one might expect a journeyman pipemaker to have earned something approaching the craftsman rate indicated - perhaps ca.12s a week.

By the early C19, however, things were much different. By 1795, in which year Sir Frederick Eden found rural Gloucestershire was still worse off than Bristol, wages had begun to rise (Little 1954: 175, 1967 ed) - though Latimer (1887: 6-7) says the wages of unskilled labourers in Bristol in 1801 were still ca.8s-9s a week - and by 1810-12 a labourer was earning 13s-15s a week and a craftsman 21s-27s a week (Little 174); but prices had gone up sharply - about double the increase in labourers' wages (Little 174-5) - and these wages are those only of people who had regular employment. In 1795 an advertisement in the local Bath papers offered 3s6d a day and two quarts of ale to skilled miners if they would migrate to Staffordshire, which suggests local north Somerset wages for this class were appreciably lower - perhaps 2s6d-3s a day, or 15s-18s a week (Bluhm 1971: 60). The emphasis here, however, is on skilled miners. The Bristol pipemaking industry, on the other hand, was at an all-time low in the last decade or so of the C18 and the first decade of the C19, and there must have been gross and chronic unemployment among pipemakers there to judge by the numbers who had taken their freedom into the 1780s. (With these wages in mind one realizes the force of the electioneering bribery of Mr Davis, the Tory incumbent who headed the Bristol polls at the October 1812 general election, who offered 7s6d cash, three quartern loaves (then costing ca.1s6d each), and 14 lb of beef from blue-beribboned oxen paraded through the streets among the many inducements, strong-arm and otherwise, to vote for him (Latimer 1887: 52) - these would have totalled more than a week's wages to a labourer, assuming he were lucky enough to have work at the time.

London pipemakers were certainly adversely affected by the increasing cost of living during the period 1790-1820. As already noted (Section I above) they were earning 18s a week in 1816, 9s less than in 1809-15 and only as much as they had been earning ca.1799. With the prospect of their wages being still further lowered to 15s the journeymen pipemakers struck and succeeded in establishing their own factory in February 1819 in Southwark. No details are given as to the success of this venture.

The Gorgon (no 44, 20 March 1819: 349) gives the average wage at this time, taken throughout the year, of a London "mechanic" as not more than 25s a week. As it considers this figure inadequate when related to costs for rent, fuel, and provisions, it is clear that the pipemakers earning only 18s a week and threatened with a 3s reduction were appreciably worse off. Certainly these wages compare unfavourably with those of 25s-30s or more recorded in the earlier 1810s for a variety of London crafts - in 1812, for example, tailors, shoemakers, bookbinders, goldbeaters, printers, bricklayers, coatmakers, hatters, curriers, masons, and whitesmiths were all receiving 30s or more a week, a wage which at that time appears to have been regarded as good money (quoted in E.P. Thompson 1963: 263-4, 1968 ed). Schwartz (1973: 95), discussing East London occupations and incomes in the late C18, notes that "Making allowances for Sundays and public holidays, a bricklayer's labourer would, if fully employed, be earning £30 p.a. in the 1770's and 1780's and about the same amount, in real terms, by 1815". Even allowing for only one-sixth of the year off in unemployment, however, the average weekly wage in the 1770s and 1780s would have been less than 10s, and for most labourers this would have been less. The actual average wage in 1815 is not stated, but Schwartz notes that the traditional differences in wage between trades appears to have been maintained through the war years, with a bricklayer's labourer earning between 60% and 70% of a bricklayer's wage: taking Thompson's figure of 30s or more for a bricklayer in 1812, a bricklayer's labourer should have been earning ca.20s or slightly more, or somewhat over double his wage for the 1770s and 1780s. According to Schwartz' highly skilled and well-paid trades in East London were paying

25s-30s a week before the 1790s and usually subject to much less seasonal unemployment, while the "inferior" artisans were earning ca.21s a week averaging out over the year to perhaps nearer 18s and for many less. It is therefore clear that with a wage of ca.18s a week in 1799 the London pipemaker was in the inferior artisan class, and earning appreciably less than those in the skilled crafts in London in this period; it also appears that if the Liverpool cost of living was in any way comparable to that of London the highest-paid Liverpool pipemakers of 1796 were well off for their time. In view of the suggestion made in 4: II that the Liverpool pipe industry appears to have flourished until the 1830s it seems likely that at the very least Liverpool pipemakers contrived a modest increase in wages in the two decades following 1796.

One London craft which did manage to press up its wages throughout the period 1795-1815 was that of the tailors. By dint of effective combining, wages in this industry were raised steadily from 25s to 36s in 1813 (E.P. Thompson 1963: 282, 1968 ed). Thus over the period 1795-1813 London tailors increased their wages by almost half as much again. This pattern is closely similar to that for the pipemakers - between the 1790s and 1809 the latter managed to raise their wages by exactly half as much, though in absolute figures they were earning appreciably less than were the tailors. In Thompson's view, however, even these increases probably lagged slightly behind the rise in the cost of living over this period.

Ashton (1948: 158) notes that while the cost of living in 1831 was 11% higher than in 1790, urban wages had increased by 43%, from which one might deduce that by the 1830s, when the rapid rise in the cost of living over the period 1790-1815 had subsided to a more stable and somewhat lower level, the average worker was better off than he had been at the end of the C18. In 1825, subsistence level for a married man with a wife and four children was set at 28s3d a week by a correspondent in a Nottingham paper (quoted in Chapman, Chambers, and Sharpe 1970: 147), of which 17s9d went on food; but the diet listed does not appear to be that of a family in dire poverty, tea, sugar, butter, cheese, milk and meat - five lb of the last - all appearing in appreciable quantity. However, as Thompson points out (1963: chapt 8 esp. pp269, 273, 275, 277, 283-4, 289, 294, 1968 ed), urban wages were largely based on the wages of skilled workers in full-time work, and their use disguises the fact that in the second quarter of the century the number of chronically underemployed was moving unfavourably in relation to those in full employment whose wages were rising throughout the country. The Nottingham figures, for example, would have been based on the diet of prosperous lace-workers, whereas the depressed framework knitters would have had family earnings rarely exceeding 15s (Chapman, Chambers, and Sharpe 1970: 148). Thus a widening gulf arose between the prospering classes and the poor until by the last quarter of the century the "people of the abyss" - whether in East London or St Jude's, Bristol - represented the lowest classes of humanity. About 1842 it appears that the most skilled classes of coalminers, the coal-breakers, could earn in north Somerset 2s6d-3s a day, or 15s-18s a week, a rate which is probably about the same as that which they were earning in 1785. Agricultural workers in north Somerset ca.1842 were probably earning only 7s6d-12s a week (Bluhm 1971: 59-60). Booth's poverty-level of 18s-21s a week for London in the last decade of last century could equally well have been the poverty-level of ca.70 years previously though the affluent classes possibly doubled their income during this time.

It was predominantly from these lowest classes that workers in pipe factories in the C19 appear to have come. As noted elsewhere, the pipe industry declined in the later C18 as the popularity of snuff steadily increased through the century, but on the evidence of the London figures, wages were actually rising during this period. The London evidence suggests the major blow there came when the pipe industry was unable to raise its wages sufficiently during the period 1790-1820. In the case of the Bristol industry the major blow was the loss of a flourishing oversea trade when it was hit first by the Stamp Act troubles of 1765-66 and then by the American Revolution in 1775. The change from the respectable social and geographical position still held by Bristol pipemakers in 1775 to the rapid emergence during the decade 1811-20 of the poor eastern working-class suburb already existing outside the city boundary - later known as St Jude's (6: VIII) - as a pipemakers' ghetto illustrates the equally rapid change of fortune which overtook the pipemaking industry in Bristol at the end of the C18. The progressive entrenchment of virtually all Bristol's pipemakers from the revival of the industry there ca.1805 within this small area as the C19 continues (FIGS 142-45) merely emphasizes the increasing poverty of the trade.

An equally rapid and more spectacular decline of fortune can be seen in the London tailoring trade. As already noted, London tailors' wages steadily increased during the period 1795-1813, almost keeping abreast of the rising cost of living, and until the later 1820s their powerful combination gave them the advantage over their employers. In the later 1820s however, the increasing number of cut-rate tailors prepared to work long hours for low rates and to use their families as assistants began to undercut the highly-paid tailors and in 1834 the latter was broken. Only 15 years later, in 1849, Mayhew cited the tailors as one of the worst examples of cheap and shoddy sweated industry (E.P. Thompson 1963: 283-4, 1968 ed). Perhaps the most spectacular crash of this sort was that of the woolcombers in the north. This class of worker changed almost overnight from the privileged elite of the worsted industry to defenceless outworkers in 1825. By 1830 they were in poverty and in 1832 Cobbett told of the thousands of men in the Halifax area who from a former wage of 25s-30s a week were now reduced to 5s,4s, or even less as the use of machinery (and equally important, the threat of its use), reinforced by the effects of an unsuccessful 23-week strike, broke the power of a class of hitherto key workers in the industry (Thompson pp311-2, 313-4).

One of the problems in the weaving trade in the earlier part of the C19, was, as one bewildered employer expressed it, 100,000 weavers doing the work of 150,000 when there was no demand and when wages were so low that they had to be made up from the poor-rates: under-pay made for over-work by those who could find employment and increased unemployment overall because those who were employed were doing the equivalent of more than one man's work in order to obtain a wage which even approached enough to live on (Thompson pp309, 289).

It seems very likely that such a situation obtained in the C19 pipemaking industry. The evidence available for the costs of pipes is too sketchy for detailed evaulation, but some observations can be made. Where wholesale prices are available they suggest there was little difference between those at the beginning of the C18 and those at the end of the C19. Indeed, Flanagan's cutties at 3/4d a dozen wholesale and Corcoran's prices of 1-1/2d a dozen for their best-quality pipes - Churchwardens and the like - and 1d a dozen for cutties are lower than the prices Warton was paying at Beverley in the early 1700s. The increases in retail prices appear to have been due to the increasing appearance of middlemen. It thus appears that only by increasing production, and finding new markets - for example, abroad - could a pipemaker hope to increase his earnings. As references noted in 1: VII(e) indicate, cutties became very popular in the later 1830s and as late as the 1850s, but the abrupt decline in the number of pipemakers all over England in the second half of the C19 - the disappearance of almost two-thirds of the Bristol firms between 1860 and 1867, for example - shows that the bottom had fallen out of a sweated industry. Whatever wages London pipemakers were earning by the end of the C19 it is extremely unlikely they would have been anywhere as high as Booth's poverty level - 18s-21s a week - in which case journeymen would have been earning less in the 1890s than they had been in the 1790s.

One would expect pipemakers to be classified as skilled artisans, and some indication of wages of others in this class in the industrial areas of south Lancashire-Cheshire-Derbyshire at this time are available for comparison with the wages given for the Liverpool pipemakers. Even these, however, are unreliable comparisons, for wages of artisans are to a considerable extent ruled by demand for their products.

In 1793 Samuel Oldknow the Stockport weaving industrialist paid smiths from 9s to 21s (the latter for head smith) and joiners between 9s and 18s a week. In 1792 he was paying plasterers and painters 12s-16s a week; in 1791 he was paying builders working on a mill between 7s and 19s a week, the lower figure presumably covering unskilled labourers. General labour rates were not surprisingly appreciably lower, though on several occasions they appear to have been higher than might have been expected. This later may have been caused by the policy of paying men by length of service rather than type of work done. In the later 1780s farm labourers on the Oldknow estate were being paid 8s-10s a week and women haymaking 3s a week; in 1800 a man engaged in farming was being paid 10s a week, and the same man in 1803 was earning 16s a week. In 1793 a labourer was being paid 12s a week, and over the period 1799-1803 outdoor workers on the estate were earning steadily-rising wages - builders and roadmakers who had been earning 13s-15s a week in 1799 were earning 18s-21s a week in 1803 (Unwin, Hulme, and Taylor 1924: 164, 162-3, 142, 167, 219 n.1). The rise in the rates for outdoor workers reflect the rising cost of living in this period; it is reasonable to assume that artisans' wages rose similarly, but only if what they produced continued to be marketable and the craft continued to be specialized enough to need skilled labour (either in the work itself or to operate machinery) and there were not too many craftsmen with the relevant skills available.

The figures available for the wages of those engaged in Oldknow's mills in the 1790s suggest that the Liverpool pipemakers were appreciably better off than all but the most highly-paid millworkers. In 1791 bleachers and printers were being paid between 12s and 17s a week - women at 5s - and in 1791 and 1793 carders, cutters, warpers, and winders were receiving from 9s to 14s a week; ca.1790 spinners, slubbers, and winders were earning between 4s and 15s a week, with the average wage for 37 workers being 9s (Unwin, Hulme, and Taylor 1924: 107, 130, 132). These wages may have been higher than in some other mills, for Strutt at Derby in the period 1784-87 was paying male reelers only 3s-5s6d a week, with the overseer getting 7s-10s - women were paid 1s-2s3d (Fitton and Wadsworth 1958: 244-5).

In the more rural cloth industries, combers in Suffolk, who were in the position of small masters and occasionally had journeymen or apprentices under them, were ca.1784 earning ca.10s a week; spinners, including women and children, averaged 1s6d (Unwin 1927: 299). At Frome, Somerset, weavers were earning 20s a week in 1800, almost three times what a farm-labourer was getting, according to Hudson (1965: 141, 1968 ed), although by this time the cost of living was rising so steeply that comparisons are hardly meaningful.

Figures given by Ashton (1924: 189-93, 1963 ed) for wages in the iron industry indicate wages here were markedly lower at the end of the C18 than that given for Liverpool pipemakers in 1796. The most highly-paid furnacemen, the keepers, averaged between 10s6d an 14s or so, depending on location, during the last two decades of the century; furnace labourers earned 6s-9s a week during this period in Shropshire. (By ca.1830 a keeper might receive ca.30s a week; an unskilled labourer ca.10s-13s.) In the 1780s the engine-men at larger ironworks, who were considered relatively well paid, probably averaged 15s-16s a week; in the 1790s a good smith could earn 18s or even more. These examples reinforce the impression that Liverpool pipemakers in 1796 were earnng a very good wage by the standards of the day, and that London pipemakers too earned more at the turn of the century than skilled workers in heavy industry.

It is difficult to estimate how much money was necessary to live reasonably comfortably, for this must have varied greatly with area - to compare closely the wages for Suffolk weavers and those in Lancashire for the 1780s as given above would probably be invalid.

In 1795 the Oxfordshire Quarter Sessions fixed the absolute minimum for the support of a married couple and four children, exclusive of rent, at 9s a week (Unwin, Hulme, and Taylor 1924: 167-8). Two years later, Eden, investigating the Wiltshire village of Seend, found that the wages of an agricultural labourer there varied from 7s to 9s a week. Taking the average as 8s, he showed that the weekly income of one typical family, where the wife and eldest child earned 4s6d from spinning, was 14s including 1s6d parish allowance. All but 1s6d of this went on bread (11s) and butter, this last obtained at a reduced price from the man's master. No rent had been charged for the man's house for a long time, and the house was now considered freehold; fuel was generally stolen from the countryside. In another example, a widow with a large family was able, with the help of earnings or contributions from five of her children and 5s a week from the parish, to earn, when work was available for all contributors, 14s6d a week. The weekly expenses, including 1s for coal, came to 14s4-3/4d, but when barley bread was not baked at home the cost of buying it alone came to 13s-14s a week - as it was, barley flour took appreciably more than half their weekly earnings (quoted in Flinn (ed) 1964: 153-7). This suggests that the bare minimum for existence for a man and his family was definitely higher than the 9s fixed two years before in Oxfordshire. In Gloucestershire, daily wages for common farm labourers in 1796 were noted at from 1s4d to 1s6d a day (with extra at harvest-time) and these figures are comparable to those for a few years earlier and similar to or slightly higher than those in a 1807 source (Woolrich 1974: 183 and n.59), indicating the same range - 7s-9s - for Gloucestershire farm labourers as for their Wiltshire neighbours at this time.

However these rates may have differed from area to area, it is still clear that the Liverpool pipemakers' wages of between 14s6d and 24s a week for men and 7s for women gave them a very comfortable income, especially where the husband was the sole breadwinner in the family. On these figures a pipemaker could earn more than an agricultural labourer and his entire family. It is possible that labourers in southern England were paid less than those in the industrial north (cf Gilboy 1936: 139-41), for in 1793 one of Oldknow's labourers was earning 12s a week to which his family could add ca.2s from the wife's cotton picking, and 2s6d, 3s, 3s6d, and 4s respectively from the two boys and two girls employed as spinners and makers-up. This gives a total family earning of ca.27s, but it would be unwise to take this single example as typical - the man's work may have involved more skill than that required by a farm labourer and it is likely that employment at that wage would have brought keen competition. The families at Oldknow's whose combined wages approached the subsistance level suggested by the Wiltshire and Oxfordshire figures noted above were those where there was no adult male wage-earner in the home (Oldknow figures from Unwin, Hulme, and Taylor 1924: 167-8).

As already noted, R. Campbell in his The London Tradesman (1747) observed that "the few [journeymen pipemakers] that are...constantly employed" earned 10s-15s a week; and the A General Description for all Trades....of the same year gives 10s-12s a week as the figures (cf Oswald 1970b: 230). Campbell lists a number of trades where the journeymen earn "the common Wages" of 12s-15s a week, for example, combmaking, cutling, and tallow and wax chandling; journeymen loommakers made 10s-15s a week, journeymen glassmakers and glovers 10s-12s, and labourers used by tobacconists to cut the tobacco 12s. A journeyman surgical instrument maker could earn 15s-20s a week, a pewterer 15s-21s a week (though he soon developed lead-poisoning), a journeyman silk weaver if employed steadily 18s-21s, a journeyman jeweller 20s-25s; and specialist journeymen in silver-turning and snuff-box or tweezer-case manufacture could earn 20s and even 30s a week. Describing the wages of a fishing net maker Campbell commented they were "no more than Nine or Twelve Shillings a Week"; and discussing hour-glass making noted that there was not "much to be made by those employed", a journeyman earning 10s-12s a week. The comments indicate wages in this range were poor, so that pipemaking in London in the mid-C18 was at the low end of the scale even when employment was steady.

These wages were high, however, compared to what the famous and prosperous Staffordshire potter Thomas Whieldon was paying his journeymen in the middle of the C18. These individuals, each of whom had special skills, were paid from 5s3d a week for the person responsible for preparing the slip to 8s for a turner. Sometimes payments were made in kind, generally clothing (noted in J. Thomas 1971: 169-71; cf Weatherill 1971: chapt 7 esp. pp98-101). Shaw (1829: 189-90, 1970 ed) records the recollections of a certain W. Wood who after finishing his apprenticeship with Josiah Wedgwood, an even more famous and prosperous Staffordshire potter, agreed to serve Wedgwood as a modeller for four years at weekly wages of 4s, 5s, 6s, and 6s6d, plus an earnest of 10s6d each year, though in fact after one-and-a-half years of this arrangement Wedgwood increased Wood's wages to 8s a week, with 10s6d presents added now and then. Wood's father, Aaron Wood, on finishing his apprenticeship to Dr Thomas Wedgwood (not of the same family as Josiah) in 1738, agreed to become a journeyman with Dr Wedgwood for five years at 6s a week, a sum which was 1s more than Wedgwood's other journeymen were paid and which Aaron Wood received in recognition of his abilities; and in 1743 he agreed to work for John Mitchell for seven years at 7s "for every six days that the said Aaron Wood shall work for the said John Mitchell", with an annual payment of 10s6d in addition (S. Shaw 1829: 150-54, 1970 ed). (It is true, however, that both Woods received a weekly wage during their apprenticeship, though of very modest amounts, Aaron receiving 1s weekly for the first three years, 1s6d for the next three, and 4s for his final year; and his son working up from 2s3d to 3s6d over a four- or five-year period. Weatherill (1971: 98; cf p.486 n. 12 below) suggests this, together with the supplying of a few specified items of clothing, replaced the master's earlier obligation to supply all the necessaries for his apprentice during his term.)

As noted earlier, Kearsley's Table of Trades (published 1786 but information tending to be for an earlier period) notes that a pipemaker was paid £5 to £10 when taking an apprentice, and Campbell and the A General Description of all Trades... both published in 1747 give from no payment to £5. Oswald (1970b: 230) notes a payment of £10 and another of £15 to London pipemakers in 1721 and 1717 respectively; payments ranging from £2 to £7 in the 1710s, 1720s, and 1750s to makers in the Home Counties; and one of £20 in Sunderland in 1768. A fee to a tobacconist (presumably in London) during this period is £80, again shows that pipemaking was not a rich man's trade. The concentration of London pipemakers in slum areas (Woodman in Atkinson and Oswald 1969: 174 - discussed in 4: VI) reinforces this impression as does an examination of the indentures for the London guild's apprentices admitted freemen for the period 1689-1708 - 55% were unable to write their names, compared to 15% found in a random check over the same period for other companies (Woodman in Atkinson and Oswald loc. cit.; Oswald 1970b: 229). However, many pipemakers did leave respectable wills (Oswald 1970b: 230), and Peter Birchall of Rainford, one of a Lancashire family which made pipes for over 200 years, had an inventory totalling £117 when his will was proved in 1691 (Berry 1963: 2); but if the Samuel Lucas of Chichester who put his mark to his will of November 1691 (Atkinson in litt. 17 October 1970; see now Atkinson 1972e: 39) which left 1s to each of his wife, two elder sons, and daughter, and the rest of his goods and working tools to his youngest son was at the lower end of the scale - his three witnesses were also illiterate - surely the John Robinson of London who sent his son to Charterhouse and Caius, Cambridge, in the first half of the C17 (Robinson and Spence 1937: 201, Oswald 1970b: 230) must have been unique.

At the Gloucestershire quarter sessions in April 1732 the wages of labourers throughout the county were regulated, and the various rates give some idea of the average earnings of the working classes in the area round Bristol, particularly in the growing industrial suburb outside Lawford's Gate which was in the out-parish of St Philip and Jacob and beyond the city limits until 1835. Carpenters, wheelwrights, and masons, as well as mowers during the hay-harvest, were to receive a daily wage of 1s2d without drink or 1s with drink, the same rates which had been set by the Somerset magistrates some years earlier. An ordinary labourer was to be paid 10d a day, or 8d if drink was supplied and 4d if food was supplied. (It appears to have been considered that every labourer was entitled to consume a quart of beer daily.) These rates indicate artisans were getting 7s a week, or £18 4s a year, and unskilled labourers 5s a week, or £13 a year. A head maidservant or cook was to be paid £2 10s a year, a second maid £2. On farms a head labourer was allowed £5 a year, a second labourer £4, and a driving boy £1, with food (Latimer 1893: 182). These rates were no doubt lower than those for equivalent trades in the towns - as noted below, carpenters engaged on the new Bristol Council House 28 years earlier were earning 10s a week as were masons, while the labourers earned 7s a week (Latimer 1893: 59-60); and Bristol journeymen carpenters in 1747 were earning 11s a week (Latimer 1893: 238). Rural wages in Gloucestershire appear to have increased little by 1768 - Arthur Young in his survey that year of agricultural conditions in the south of England noted labourers in some parts of Gloucestershire earning 6s a week in summer and 4s-5s in winter but he also notes that wages as low as 9d a day - 4s6d a week - were often difficult to obtain for even the strongest labourer (noted in Latimer 1893: 385).

In 1688 Gregory King made his statistical account of England, dividing the population into numerous classes and estimating the number of families in each class, the number of heads in an average family of each class (a figure which included servants) and from this deducing the number of people in each class and the total population of the country (which last he put at 5,500,520). He also estimated the average yearly income per family in each of his classes (for a selection of these figures see Trevelyan 1942: 277, 1946 ed). As many authorities (e.g. Unwin 1927: 345; Trevelyan 1942: 276 and 278, 1946 ed; Ashton 1955: 22-3, 1961 ed) have noted, these figures cannot be regarded as in any way statistically accurate - Unwin said they are "little more than educated guesses" - and Defoe, for example, writing in 1709, listed in order his seven classes of the population and placed artisans above farmers (quoted in George 1925: 363-4 n.48, 1966 ed) whereas King gave the average family income of a farmer as £42 10s as opposed to £38 for an artisan. King's averages were probably in many cases for ranges which were so wide at their extremes that an average would have relatively little meaning, but his figures are worth considering if for no better reason than that they are the only ones of their kind available.

The initial tentative deductions about pipemakers' earnings from Houghton's observations suggested that a master might earn 18s, a journeyman ca.12s, and an apprentice and masters' wife ca.6s. Thus the annual income of a master on this estimate would be ca.£46 and that for a journeyman ca.£31. Neither figure would include additional family income - from wife and children, for example. If, on the other hand, we take the wages set by the Bristol Tilers and Plasterers' Guild and Carpenters' Guild in the 1660s and 1670s a master would have earned only ca.£31 a year and a journeyman ca.£26.

The most likely of King's classes in which master-pipemakers would have been included is "artisans and handicrafts", whose family earnings are given as £38. Thus the £46 suggested from the first estimation based on the organization of Houghton's business for the master's earnings alone is likely to be too high - with additional family income the figure would be well over £50 and bring him above "shopkeepers and tradesmen" (whose annual income King estimated at £45), "lesser clergymen" (annual income estimated at £50) and possibly even above "free Holders of the lesser sort", estimated by King as averaging £55 a year. However, if a Bristol master carpenter was earning ca.£31 a year then to obtain the additional £7 a year to bring his wages to King's wages average for "artisans and handicrafts" would involve adding only ca.2s9d a week to the family income. On these figures therefore, a Bristol master carpenter should easily have been earning King's average for his class. It is reasonable to suppose that Bristol pipemakers of the same period would have generally-comparable wages - indeed, the prosperous state of the pipemaking industry with its New World trade suggests that pipemakers could have been earning more. We may therefore hazard a guess that at this time and in Bristol at least a master pipemaker would be earning 2s-2s6d a day.

The wage for a journeyman carpenter in Bristol in the 1660s and 1670s - ca.£26 - seems reasonable when compared to King's figures - certainly one would expect him to earn more than "labouring people and out-servants" - £15-and "common seamen" - £20 - and with family income he would be approximating the £38 of the "artisans and handicrafts" to which group one would expect him to belong. Carpenters engaged on the new Bristol Council House in 1704 earned 1s8d a day (10s a week), the wage laid down in their guild ordinances of 40 years before for journeymen and perhaps therefore an average figure for the workmen engaged; masons on the same project received the same amount. The labourers made 1s2d a day (7s a week), which represents £18 4s a year (Latimer 1893: 59-60). By 1747 the wage of a journeyman carpenter had hardly changed, being 1s10d a day or 11s a week (Latimer 1893: 268).

The beginning of the C18, as noted in Chapter 1 and elsewhere, saw the height of the popularity of pipe-smoking; thereafter smoking began to decline except at Liverpool, where alone the industry seems to have boomed during the last third or so of the century. This, together with the overall level of real wages showing only a slight rise during the first half of the C18 as the cost of living declined slightly (Gilboy 1936), suggests whatever the evidence deduced from Houghton and King may represent in absolute figures, it probably represents as high or higher a standard of living for pipemakers than they were to experience (with the exception of Liverpool makers) in the following century. That wages remained unaltered from early in the C18 well into the second half is suggested by figures noted by Ashton (1955: 220, 1961 ed) - Westminster and Southwark masons' labourers were earning 2s a day from 1731 into the 1780s; and bricklayers, masons, and plumbers in the areas earned 2s6d-3s a day from 1700 to 1790. Similarly, Oxford builders' labourers earned 1s3d a day from 1700 to 1770.

On Schumpeter's evidence (1938: 34 table 4) the price indices for consumers' goods and producers' goods in 1700 were slightly lower than they had been for 1660 - there had been a slow decline from the 1660s to the late 1680s and then a rise - and it seems unlikely that there would have been any major differences between wages and prices when King made his estimates and those for earlier in the second half of the century. What pipe prices there are available prior to Houghton's time - e.g. 2d a dozen in 1671, 3d a dozen in 1640, 2d-3d a dozen in 1619 for ordinary pipes - tend to suggest, not surprisingly, that earlier pipes were more expensive than the prices given by Houghton. The same holds good for the best-quality pipes, which cost 6d a dozen in 1619 (Houghton listed ordinary pipes at 1-1/2d a dozen and polished pipes at 2d-3d a dozen.) It must be remembered that until Virginia tobacco started to arrive in Britain in the 1610s and 1620s in rapidly-increasing amounts, tobacco supplies were uncertain and very expensive - pipes can thus be expected to command a higher price but a smaller market in the first quarter of the C17. The earnings of a pipemaker must have been determined to a considerable extent not by the price of his products but by the market available to him.

Inventories dating to the later C17 and earlier C18 listing the effects of deceased pipemakers suggest some makers achieved a certain prosperity in their trade. However, two Cornish makers, Simon Earle I of Bodmin who left property valued at £222 11 10 in 1683 (Douch 1971: 147, 145) and Gregory Honychurch I of Penryn whose property was valued at £186 in 1732 (Douch 1971: 149) certainly cannot be regarded as typical even of the most successful makers - in Earle's case, leasehold property accounted for £165 6 0, while Honychurch's total included two "small estates" one valued at £80 and the other at £70. In 1696 the Window Rate for Bodmin noted that Simon Earle II's house had five windows and that another house of his, occupied by a Charles Poolstreet, had eight windows (Douch op. cit. 147). Rather more typical of prosperous pipemakers are probably George Wakeham I of Truro in Cornwall who left property worth £37 13 6 in 1707 (Douch op. cit. 151); William Atwell of Arundel in Sussex who left property worth £37 13 2 in 1727 (G.H. Kenyon 1968: 106 and Atkinson 1972e: 39); Isaac Bilby of Spalding in Lincolnshire who left property worth £37 5s in 1727 (P.K. Wells files); and William Case of Downham Market in Norfolk who left property worth £35 4 11 in 1691/2 (Oswald in litt. 11 October 1972). Somewhat more modest are the estates of William Harpley of Great Yarmouth in Norfolk valued at £21 0 8 in 1674/5 (Oswald loc. cit.), Matthew Heblethwight of Lincoln valued at £19 15s in 1729/30 (P.K. Wells files), and John Barnard of Bodmin in Cornwall valued at £16 10 6 in 1670 (Douch op. cit. 147). Case in particular appears to have been prosperous, for the detailed inventory of his assets indicates he had a two-storey six-roomed house (including the shop) plus a stable and workshop. That the shop was in the house is shown by a reference to a "Shop Chamber" - presumably the bedroom above the shop; there are similar references to a "Parlour Chamber" and a "Hall Chamber" - and no doubt the shop was simply a front room with its window opening for business on the street. "One silver tanker one silver cup & 7 spoons" in the "Parlour Chamber" and valued at £4 were the only prestige items listed, though as noted below (p.581) Case had a mare valued at the same amount. Unfortunately neither the Atwell nor Wakeham inventories as published describe their non-pipemaking assets, which would have been interesting to compare to Case's in view of their total inventory values being so nearly identical. Wakeham evidently lived in a two-storey premises, however, for there is a reference to a "chamber over the shop" suggesting the same sort of arrangement as Case had. The Harpley inventory included "one silver Beaker & two silver spoons" valued at £2, but gave no details of the house. Much poorer, and perhaps typical of the average pipemaker, were John Oates of Truro, whose estate in 1725 totalled only £11 15s of which £10 represented "a pore old house much out of repaire"; and Nicholas Hambley, also of Truro, whose quite detailed inventory came to even less, £9 1s, out of which "one dwelling house and garden", two-storeyed, was valued at only £2 10s, in 1690 (Douch 1971: 150, 145). By comparison, Douch notes that the inventory of a contemporary Truro potter in 1688 listed property valued at £39 1 6d, a figure almost identical to the inventory values for Wakeham, Atwell, Bilby, and Case noted above.

A point of interest in those inventories which are detailed enough to itemize belongings is that ceramic vessels are still rare: Case in 1691/2 had "Nine puter dishes 24 plates 4 salts one tanker & a poringer & a bason" worth together £2 12s and "6 wooding dishes 12 trenshers" total value 9d, plus various pieces of metal kitchenware but apparently no ceramic articles at all; Harpley in 1674/5 had 5s-worth of "Brasse & Pewther" but only 1s-worth of "Earthen dishes"; Bilby in 1727 had "6 small pewter dishes" valued at 10s and "6...and one earthen plate & other ware" valued at 12s; Heblethwight in 1729/30 had "brass & pewter" to the value of £1 but apparently no ceramic vessels; Oates in 1725 had "four platters and seven plates" worth 10s but whether ceramic, metal, or treen is not stated; while Hambly in 1690 had no pottery but quite a collection of metal and treen vessels as the following list indicates:

18 small putter dishes	12s0d
3 plats, 5 poreg dishes of tynn	1s6d
one quart, one pint, one half-pint, one tyn cup	1s0d
one tyn chamber pott, one tyn candle sticke	1s0d
one bell mettle skillitt, one brass candle sticke	2s6d
one brass kittle, one small brass pann	6s0d
five timber dishes, five spoones, five timber trenchers	1s0d

All these items - their total value is £1 5s - were listed "in the Hall". This rarity of ceramics continuing into the earlier C18 bears out an observation of Latimer when describing the visit to Bristol in February 1734 of William IV of Orange who was about to marry Anne the Princess Royal, daughter of George II: 26s, he records, was "paid for the use of Cheny", which apparently indicates for the first time that pewter plates were felt to be unworthy of the occasion (Latimer 1893: 187-8).

Between 1565 and 1664, wages of skilled craftsmen in the building trade - masons, helliers (slaters or tilers), plasterers, carpenters, and sawyers - in Plymouth rose from between 6d and 10d a day to between 1s and 1s4d a day (Welch (ed) 1967: xvi-xvii). In 1583 a mason, a carpenter, and a plumber received an average wage of 1s a day (quoted in G.H. Kenyon 1967:

111), a half to a third of what they would have been earning in the C18 (see above). As these crafts represent skilled labour their rates might be broadly comparable to those of pipemakers in the first half of the C17, and an estimate of ca.1s-1s6d a day as an average pipemaker's wage for this period may not be far from the mark - according to Latimer (1900: 346-7) a workman in Bristol in the middle of the C17 never received more than 1s a day.

With these sorts of wages the occasional presentation of tools to the apprentice on the completion of his term must have been a very real asset. In the Bristol apprentice rolls there are two cases of this in the 1630s and one in the 1650s: in 1633 Edward Lewis I undertook to give Bartholemew Elliott tools to the value of 20s and in 1637/8 he undertook to give Richard Jones a mould and a vice - the two most important and costly items of the trade - or 30s. This would suggest it took a minimum of 30s-worth of equipment before one could set up as a journeyman, and more if one wished to set up as a master - one might need, therefore, three-quarters of a years' income to set up business in the normal way. In 1654 William Williams undertook to give Lewis Williams 30s as well as "a mould and a screw [vice] &c", which seems an extraordinarily generous arrangement. (Incidentally, nothing more is ever heard of these three apprentices - they never appear to have become freemen). In 1742 the inventory of Nathan Birchall, one of the Rainford Birchalls, valued a mould at 15s. His soaking-trough, on the other hand, was worth 2s6d, an indication of how valuable the mould was held to be (Berry 1963: 3).

Duhamel du Monceau (1771: *passim*) gives scattered references to wages and selling prices for pipes in northern France and The Netherlands, but there is not enough information to attempt a detailed analysis. In northern France the *mouleurs* were paid 5 *sols* a gross: a skilled *mouleur* could produce ca.20 gross pipes, that is just over three gross a day, in a six-day week, which gave him a weekly wage of ca.5 *livres*. This gave him a monthly wage of approximately half the 40 *livres* paid to the *batteur*, who prepared the clay, but as has already been noted in 2: I the *batteur* had a particularly onorous job.

In The Netherlands the *rouleurs* and *mouleurs* were paid 4-6 Dutch *sols* per gross, the *rouleurs* getting rather more than the *mouleurs*; the *trameuses*, who were girls, were paid 2-3 *sols* per gross. The wages of the *trameuses* compared to those of the *rouleurs* and *mouleurs* indicate that as in Britain trimmers were paid rather under a half that paid to the moulders.

SECTION III: CONCLUSIONS

As noted at the beginning of this chapter, the wide scatter geographically and chronologically of wages and prices makes interpretation difficult. With the exception of the Barnstaple 1599 reference to a cost of 3/4d a dozen, which as explained is probably very low because the local ballclay deposits must certainly have been used, and the Saltash and Millbrook references of 1622 and 1633 respectively to costs of 1-1/2d and 1d a dozen, which may be low because ballclay from the relatively close South Devon deposits was possibly used by the local Plymouth industry, prices quoted in the early C17 are relatively high when compared to average wages - 6d a dozen for best-quality pipes in London in 1619 may have represented about half a day's wage to an average skilled labourer and even 2d-3d a dozen for ordinary pipes at the same period suggest that those who regularly bought pipes at this time came from the better-off sections of the community. This, however, merely agrees with the evidence from tobacco prices (1: IV) which indicates that one had to be quite well off to indulge in the weed.

Probably before the middle of the C17, however, and certainly before the end of the century, the price of a dozen pipes, even of the best quality, was not above ca.3d, and ordinary pipes cost half that. This clearly represents the steady spread of smoking among all classes which followed the lowering in price of tobacco. The quite marked increase in pipe bowl size towards the end of the C17 must also represent the increased availability of tobacco at all social levels.

The range, depending on quality, of ca.1d to ca.4d a dozen appears to have remained constant throughout the C18, though towards the end of this century the cost of living began to rise with ever-increasing rapidity. However, the cost of living had remained steady over the previous 100 years or so, which suggests that the apparent stability of pipe prices was probably real.

The effect of the rapidly-increasing cost of living on pipemaking in London at the beginning of the C19 is well illustrated in the accounts in the Gorgon - the 1809 wage-increase was the last time the London pipemakers were able to keep abreast of the rising cost of living, and in the 1810s their wages, both real and in relation to the cost of living, fell. Thereafter, though the number of pipemakers increased (Oswald 1960a: 45-6, figs 18 and 19) and the clay pipe was returning to fashion by the late 1830s (newspaper account of 1838 quoted in Hermessen 1926: 326) and had become a "mania" by the mid-1850s (Anonymous 1856a: 94), it is clear from C19 accounts such as ones noted above that pipemaking was a sweated industry and its workers always in considerable poverty; and with the introduction and spread in popularity of the brier pipe (and to a lesser extent, probably the cigarette) from the 1850s onwards, the bottom inevitably fell out of the industry all over England in the second half of the century.

In Scotland and Ireland, where the tradition of tobacco-taking appears to have been different and pipe-smoking only became common in the early C19, pipemaking continued to prosper, relatively speaking, until ca.1880, when the decline set in here too. The reasons for these differences have been discussed in 4: IV.

Prices quoted in the second half of the C19 indicate that elaborately-moulded and high-quality name brands of pipes were able to command a relatively high price, which suggests that the well-to-do still bought clay pipes and were prepared to pay 6s a dozen. However, at the end of the century even Churchwardens and patterned pipes were being sold, at least in Bristol, for as little as 1-1/2d a dozen and cutties for 1d. Indeed in Leicester at the turn of the century cutties were being sold wholesale for 3/4d a dozen to publicans who distributed them free to customers. There was still some market for elaborately-moulded pipes, however, for the same Leicester maker was selling these at 6-1/2d a dozen wholesale and retail they cost 2s6d a dozen.

In the present century attrition among the remaining pipemakers continued. The price of pipes appears to have begun to rise after WW I, presumably following the cost of living and the rising wages necessary to keep workers at even subsistence rates. The unprecedently-high prices now being charged for pipes, especially for Churchwardens, is because the latter are fashionable in certain circles, and because there is a certain novelty-value attached to clay pipes. In North America at least there is a considerable market for clay pipes for smoking, and also for selling at historical restorations such as Williamsburg. In Britain the traditional association of the clay pipe with the labouring classes and particularly those from Scotland and Ireland, dies hard, though as has been shown earlier (3: I and 4: IV) it is a tradition which by and large dates back only to the early C19 and the industrializing of society. Nowadays, though there is still a dwindling band of elderly working-class people who smoke clay pipes for preference or by tradition (see FRONTISPIECE), Pollock's find their best sales area considering population density is the West End of London and that the Irish navvy is perhaps the only class of smoker who would not use a clay (J. Peterson 1968: 13). RAOB and similar organizations also use clay pipes at their meetings.

A fair number of clay pipes, however, must be bought only as novelties or souvenirs. Whether the average brier pipe smoker of today would want to change to smoking clay pipes regularly is debatable, for compared to a brier a clay pipe gives a hot smoke, and once established in a smoking habit a smoker would probably be reluctant to change, particularly to a hotter smoke, for any reason other than curiosity to see what change there would be. The fragility of a clay pipe probably tells against its more widespread use also, for the delicate meerschaum, which by no stretch of the imagination could be called a poor man's or a working-class pipe, has likewise suffered an eclipse of favour.

In view, however, of the prolonged eclipse of pipe-smoking in polite society in the C18 and the rise and fall of snuff as a fashionable means of taking tobacco and the recent re-appearance of cigars in Britain as a relatively common form of smoking, it would be wrong to categorically deny the possibility of the clay pipe industry reviving or at least continuing to hold its own in the future. When this writer visited Pollock's in 1967 production there was ca.250,000 pipes a year and Gordon Pollock was observing that he could hardly keep up with demand; in 1972 he was producing 350,000-500,000 pipes - about the number his father was producing in the 1930s - and was still not keeping up with demand. A quarter of his production goes to export, but in fact that market could probably take the firm's entire output (B. Rogers 1973: 26). The stipulation that clay pipes be used in local and national pipesmoking competitions in Britain following the formation of the Pipe Club of Great Britain in 1970 (see p.149 n.19) has no doubt helped increase the home market. Additional proof that the clay pipe market is not dead, and perhaps not even dying, is the reopening of Southorn's at Broseley and the emergence in the past two or three years of two new manufacturers, the Pilgrim Pipe Company at Skegness in Lincolnshire and Eric Ayto at Bramber in Sussex (p.262 n.4)

Gordon Pollock is undoubtedly correct in part at least when he talks of the clay pipe industry dying from a sort of mental suicide in the face of the more durable and socially-acceptable brier; and while, as he says, luck and accident have played a part in leaving Pollock's in the position of being last in the field and thus able to create their own demand, he is also certainly correct in adding the firm's more modern outlook as a factor (B. Rogers loc. cit.). This may indeed be the most important aspect of the firm's increased business, for it is not just a case of Pollock's filling the gap left by McDougall's who throughout the 1950s and up to the mid-1960s were producing 60 gross a week or ca.430,000 a year (Walker and Walker 1969: 145-6), for Pollock's have gone into the production of expensive clays with vulcanite stems (cf p.148 above and FIG 108) which in 1972 were costing from 90p (18s) to £2.20 (44s) each as well as continuing traditional lines of clay pipes (B. Rogers loc. cit.), and Mr Pollock has made two sales tours of Canada and the United States within the last ten years.

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